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Pulverised-fuel Firing.

THE report for the year 1928-29 of the Prime Movers' Committee, Engineering Section, of the National Electric Light Association of New York on pulverised-fuel firing, a review of which appears elsewhere in this issue, focuses attention once again on the much-debated question of the unit *versus* the central system of firing. As was the case in the previous year (1927-28), there was a decided trend towards the adoption of the unit system, both by public utility and by industrial undertakings. The explanation of this is no doubt partially to be found in the data given bearing on the relative furnace volumes required by the two systems, in spite of the higher average efficiency shown by the storage plant. It is not difficult to imagine that the additional 3,600 B.th.u. liberated per cu. ft. of furnace volume (mean of the average) in the case of the unit installations—15,800 as against 12,200 for the storage equipments—could more than counter a 3 per cent. drop in efficiency, from 81 per cent. to 78 per cent.

Although attention is drawn to the fact that the successful application of pulverised fuel in Great Britain calls for different treatment from that necessary in the U.S.A., by virtue of the variance in the nature of the coals, the difference does not appear to be manifest on the score of the two main systems of pulverised-fuel firing. We were particularly interested in the reasons given by Mr. F. Forrest, chief engineer of the Birmingham Electric Supply Department, in his contribution to the discussion on the paper on pulverised-fuel firing read by Mr. C. H. Lake, formerly engineer and manager, Derby, at the I.M.E.A. Conference at Eastbourne this year, for the adoption of the unit system at the new Hams Hall station, namely, lower capital charges, lower maintenance, and greater flexibility of control. These reasons are rather contrary to the school of thought which advocates the unit system for base-load stations and the storage system for peak loads. The increasing use of water-cooled walls for pulverised-fuel furnaces seems to be another point of agreement between the two countries.

Apparently little attention is given to the question of the combination of stoker and p.f. firing in the U.S.A., and we are justified in hoping that this may prove to be another " scoop " for British engineers. A few stations in this country have adopted the combined system of firing in recent years with success, and the decision to employ the same system at the new Liverpool station is of great importance; we await the results with much interest.

Domestic Supply in Birmingham.

In our " Electricity for the Home " section in this issue we give an account of what is being and has been done to push the sale of electricity for domestic purposes by the Birmingham Electric Supply Department. We like to hear an undertaking say that its heating and cooking load has improved the diversity factor of its load and also increased the earning capacity of its mains; that strikes the right note, and the correct angle of business view is proved when results justify cultivation of the load.

In a big and progressive industrial centre like Birmingham, the fact that the heating and cooking connected load represents 12.8 per cent. of the total connected load, increasing from 2.8 per cent. in seven years, is ample proof of the importance of the domestic load, and these figures should dispel doubt from the minds of any possible remaining waverers on the subject. Further, that 20 per cent. of the total heating and cooking connections was added last year is sufficient evidence of the progressiveness of the undertaking.

Another very welcome piece of information, also reflecting great credit on the Department, is that many of the builders in Birmingham are now installing power plugs as a matter of course. From the propaganda point of view, the installation of power plugs in all new houses is of supreme importance, and no supply engineer should feel satisfied that he has established the foundation for real domestic development until he has induced the bulk of the builders in his area to follow the example of those in Birmingham.

The manner in which the undertaking is tackling the water-heating problem is another point worthy of comment; 0.5d. per kWh for off-peak supply is a creditable tariff, and the connection of 217 kW last year out of a total of 508 kW is very promising.

Criticism from Overseas.

An Electrical Review reader in India wrote home to one of our advertisers inquiring the price of a certain electrical machine. The sole reply received was a recommendation that he should apply to the local agents; no technical or other information was sent, and the names and addresses of the agents were not given in the advertisement. Whatever may be the reason for such indifference to an opening for business, such treatment must surely be exceptional. Even supposing, as might happen to be the case, that the advertiser has not the right to sell the particular product in that particular market, where is the wisdom in antagonising a potential overseas purchaser of other electrical goods? The great majority of British firms are too anxious to add to their overseas trade to lead them to reject business without very special reasons. The reader in question wants to know why advertisers do not make a more general practice of publishing in their Press announcements the names and addresses of their local overseas agents and branches. He also urges them to see that goods are kept in stock so that they can be sold over the counter, instead of the local agents having so frequently to refer matters home before they can fill a small order. He remarks that local agents in India, though selling goods, do not as a rule sell technical information or " service " along with them, and this is one reason why engineers have little confidence in them. " Why could not the advertisers in question, if only out of courtesy, have replied to us through their local agent? " The same correspondent cites a further case calling for criticism. A certain well-known home manufacturer of domestic labour-saving appliances has agents in India who, when asked for minor items for replacements, had to send to England for them because they were not in stock, entailing a delay of several months. One consequence of this shortcoming is that local fitters are afforded opportunities of becoming adept at " faking," with undesirable results.

We commend these criticisms, familiar as some of them are, to traders anxious to do business overseas, for the zeal of American and Continental firms in giving service to the overseas buyer is common knowledge. If we fail to recognise the value of that salesmanship weapon we are assisting our competitors to take the bread out of British mouths.

Salesmanship and Languages.

Great Britain's dominance of the industrial world during last century gave rise to an attitude of indifference to foreign languages. If people abroad desired to acquire a knowledge of our products they should learn English—and many of them did. But persistence in this attitude in the face of the drastically-altered conditions of to-day has proved a considerable handicap to our foreign trade. Moreover, our earlier insistence on foreigners learning English has turned out to be a very serious matter for us in our home and Dominion markets.

It is clear from the report just issued by the Committee on Education for Salesmanship, which is reviewed on a later page, that we have much to learn from Continental countries in the matter of language teaching. Apart from the fact that more time is devoted to languages in Continental schools, probably the greatest difference between British and Continental methods is the fact that the latter deal primarily with the spoken word, whereas we are inclined to prefer proficiency in the written language, but ability both to write and to speak is necessary for correspondence and foreign travel.

On the other hand, it is necessary to acquire something more than the language. Though national barriers are giving way before the onrush of our common modern civilisation, there still remain those " psychological " differences which have to be understood and satisfied if business is to be secured. The study of a nation's literature and newspapers may impart understanding to some degree, but only by actual contact by residence can complete sympathy be attained, and oral efficiency is essential for this. This is fully appreciated in Germany and must be seriously considered in any scheme which may be evolved as the result of the Committee's suggestions.

To Advance Electricity Supply.

At the moment of going to Press we have received copies of two important reports by Committees appointed by the Electricity Commissioners to study means for simplifying, and therefore encouraging, the use of electricity for domestic purposes. " Simplification " has been the word used by us in these pages for many years past as expressing one of the most essential and urgent practices to be pursued by electricity supply authorities. And we can find no better word to-day. Simplification of tariffs, simplification of installation facilities, simplification of maintenance, simplification by unification, and by co-ordination; simplification of complex relationships between electrical contractors and supply authorities. The rolling away of the mists of years will enable the consumer to see more clearly, to understand more fully, and to be less hesitant and suspicious. Both of the reports now before us make recommendations which, if adopted by the Commissioners and heartily carried into effect throughout the country, should operate in this direction and accelerate the rate of electrification progress among the people. One relates to the uniformity of charges and tariffs while the other deals with assisted wiring and the hiring and hire-purchase of electrical apparatus. An abstract of the recommendations contained in both reports appears on another page, but fuller reference will be made to them in our next issue.

The I.E.C. Plenary Meeting.

Denmark—Sweden—Norway: June 27th to July 9th.

By OUR SPECIAL COMMISSIONER.

No. 2.* *—Continuation of the account of the tour, places visited, and social events, with a report of the technical meetings.*

During the first day those delegates whose committees were not sitting were able to take advantage of the arrangements made by the L. M. Ericsson Telephone Company for visiting a modern automatic telephone exchange, in a country which is a pioneer in this line. In this connection it is interesting to note that Stockholm has one telephone installed for every four persons inhabiting the town. The automatic type is absolutely predominant, and very fortunately so for those whose knowledge of the language did not even extend to a few numbers.

Fig. 5.—Dr. and Mrs. Richard Apt (Berlin) on Train-ferry from Tralleborg.

In the evening a dinner was given by the Swedish Electrotechnical Committee at the Summer Restaurant at Saltsjobaden, a delightful spot on an island situated at about an hour and a half's run through the lakes in a boat. The route lies through the inner harbour *via* the celebrated Skuru Sound, over which can be seen a particularly fine example of a reinforced-concrete bridge. Joining the lakes through the boat passes are several narrow necks where the trees on each side overhang almost in the form of a tunnel.

On the return journey, leaving Saltsjobaden sometime about midnight, the sight of the glow and the ever-changing light in the sky which really never darkens was one of the most charming spectacles of the trip.

The Advisory Committees continued their sittings on Tuesday and Wednesday, whilst for those who could afford the time the State Railways had arranged a visit to one of their shops specially built for the new electric railway. Alternatively, the works of Messrs. Luth and Rosens Elektriska could be visited, where that company makes a speciality of helical geared electric motors and helical precision gears, or, again, the works of the Electrolux Company at Lilla-Essingen were open for inspection.

The City of Stockholm paid a high tribute to the guests in inviting them to a dinner followed by a dance in the Town Hall on Tuesday evening, July 1st. Apart from the official function it provided an opportunity of visiting the whole of the interior of the building, which is probably unique in its class in the world. The dance which followed proved an overwhelming victory for the ladies, and without the slightest fear of being accused of sensationalism it can be described from their point of view as one of the most brilliant gatherings that could possibly be held in a perfect setting.

Fig. 6.—Mr. John Murphy, President Canadian Committee, Mrs. Murphy, and Mrs. Dunsheath.

Thursday, July 3rd, was a day of respite for the Advisory Committees, for whom there were no meetings that day. It was also a day of grace for the different Secretariats and staff whose admirable work is referred to later.

Relaxation (*sic*) for the delegates was provided in the form of three alternative visits. The first consisting of a visit to the Svenska Turbine Works (Ljungström) at Finspong, some one hundred miles south-west of Stockholm, the second to the works of the A.S.E.A. (Swedish General Electric Co.) at Vasteras, situated at about the same distance due west of the capital, and the third to the new plant at the hydro-electric station at Lanforsen, which forms part of the Stockholm electricity works.

Friday morning saw the delegates again at their respective committee meetings. Some of them had finished their tasks, and others had yet to begin. During these meetings visits to the laboratories of the Royal Board of Waterfalls at Upsala were arranged. These laboratories have been specially built for studying over-voltage phenomena on transmission lines and for carrying out research on lightning. The Atlas Diesel Com-

* See Elec. Rev. July 25th, 1930, p. 127, for No. 1.

pany's works were also well visited on Friday, July 4th, and on Saturday the last technical visit of the Swedish portion of the trip was made to the steam power station of the Stockholm Electricity Works.

Technical Meetings.

It might be thought from the foregoing description that the week had been devoted to sightseeing and excursions, but nothing could be farther removed from the truth.

The business side of a tour is always much less spectacular than the lighter side, but it is the heart of any successful meeting. This is particularly true of the I.E.C. meetings in general; their achievements in the field of international agreement are solid and lasting, and the mere fact that any agreement at all is achieved is sound proof of the spirit of conciliation and international give and take in which the meetings are held.

A total of seventy-eight sessions, in which some points are fought out inch by inch in two languages by nineteen Advisory Committees, spread over five full day's meetings, is no mean achievement. That the organisation has reached a very high pitch of perfection is obvious when it is considered that the meetings terminate each evening at about 6 p.m. Each Committee has its own Secretariat, part of whose duty it is to hand in a *résumé* of the day's proceedings to the central office in English or French; the *résumés* handed in in the evening are translated according to requirements, and multigraph typewritten copies in both languages are available for distribution to the delegates the following morning. Every delegate is thus in possession of the previous day's minutes before passing on to other questions, and no doubt is possible as to earlier decisions.

It would indeed be pretentious to attempt to give any adequate report on the work carried out by the different committees. Many documents, the fruit of international co-operation, were discussed, and some of them representing a considerable number of years of labour were put forward for ratification by the Plenary Meeting to be held in Oslo. Such is the state of internationalism in the electrotechnical field.

Internationalism, incidentally, was the subject of an informal meeting held on July 4th at the request of the British National Committee. The meeting was opened by Mr. P. Good, who presented a short paper on "International Electrical Organisations."

The discussion, with one dissenting exception, seemed to agree with the author's opinions, although large diversity existed as to the detail of the method to be adopted.

Finally a resolution was passed asking the I.E.C. to discuss the possibilities of further discussion when the next opportunity might arise.

It may be small, but it is a definite beginning of an attempt to organise International Electrotechnical Co-operation, and as such cannot be looked upon, except as a very important step in the right direction.

The author first of all thanked, on behalf of the British Committee, the I.E.C. for having provided the opportunity for holding the informal meeting and, continuing, stated that there would appear to be no need to take up the time of the meeting by reading even extracts from the short paper which had been circulated over his name. The paper was not intended to put forward anyone's definite opinion, but in view of the various communications which had passed in recent years about international organisations, it seemed desirable that responsible electricians from the different countries should have a discussion on the question of the form of international organisation which might be most helpful in the future.

The I.E.C. was formed after a considerable amount of preliminary discussion, and its objects and aims were definitely established. Its government was quite definitely under the control of the national committees participating in its work. Every question in the electrical field which called for international decision was admittedly the prorogative of the I.E.C. Practically all other international organisations existed for the interchange of information and for holding discussions, the great value of those meetings being the interchange of personal experience and the making of personal contacts.

Fig. 7.—Mr. Axel F. Enstrom, President Swedish Committee.

Fig. 8.—Mr. and Mrs. Dunsheath at Stockholm.

Fig. 9.—Prof. Feldmann, President I.E.C., and his Daughter at Oslo.

Recent experience had shown, however, that congresses of the sort they had had in recent times ran the great risk of being overburdened with papers which got very little attention, a large number of those papers being of a sort not really appropriate for international discussion.

The paper suggests the possibility of there being some changes in one or other of the existing organisations, or the possibility of merging together of some of those existing organisations into a body which should be representative of the electrotechnical industry as a whole throughout the world, and which, by permanent affiliation of a number of electrical engineers in every country, would have available the funds to promote continuous international exchange of technical information, calling conferences when necessary, such organisation being governed by representatives from properly-formed national committees, each of which should be responsible for seeing that the papers contributed by members in its own country were of a standard which justified international presentation.

This idea is not really a personal one. It developed as a result of discussions in Great Britain. It was made known over a year ago in certain directions, before any suggestion of a World Federation of Engineers had reached England, and it is submitted in the paper that electrical engineers would be much wiser to bring about a completely satisfactory international organisation in their own restricted field of electrical science and technology rather than form part of a comprehensive world engineers' organisation.

The proposals in the paper were only put forward under pressure to start a discussion, but the primary point that it was wished to make was that the responsible electricians in the different countries should get together with the assistance of the I.E.C. and plan for the future what in their opinion should form the best method of promoting international knowledge, and not leave it to a matter of chance or development for each of the several international bodies now in existence to survive or not survive. In other words, to discuss whether improvement was possible in the international field and, if so, what that improvement might be.

It was for this reason that the proposal in the last paragraph of the paper was made, and the author thought that the I.E.C. should be asked to call a representative meeting to consider the matter.

As previously mentioned, the Advisory Committee meetings concluded at 6 p.m. on Saturday, July 5th. The departure of the main body of delegates for Oslo in two special trains provided by the Swedish railways was in itself a large undertaking. The provision of sleeping car accommodation for approximately four hundred persons, in addition to the normal traffic, is worthy of special mention, and such little shortcomings as befell the young couple who nearly had to accomplish the journey in different trains were hastily put right.

Fig. 10.—Col. R. E. Crompton outside Houses of Parliament.

Fig. 11.—A Group of I.E.C. Members and Guests on Steps of Riksdagshuset.

The brunt of all the work fell upon the shoulders of the Swedish Electrotechnical Committee, which carried out its task in an admirable fashion; no name can be singled out, as the organisation as a whole testified to perfect team work. The ladies' committee was equally successful, as was also the information bureau, where practically anything could be obtained for the asking.

Norway.

The Norwegian portion of the meeting, taking place from July 6 to July 10th under the patronage of King Haakon VII, started with the arrival of the delegates at about 9 a.m. on Sunday morning, leaving the remainder of the day free for a well earned rest, or at least free until 7 p.m., at which time an official dinner was given by the Oslo Gas & Electricity Co.

Monday and Tuesday were entirely set aside for visits to various places of interest and works in and around the Oslo district, and gave the members of the various committees time to regenerate their strength for the plenary meeting which took place on Wednesday, July 9th.

Two separate parties were organised on the Monday, the first of which visited the power plant at Rjukan. Motor-coaches were provided to fetch the participants from their hotels, and the route followed the main road to Prammen, one of the largest export centres in Norway for lumber woodpulp and allied products. The route then followed over some of the most beautiful country where wonderful panoramic views were obtained.

Twenty years ago Rjukan was a small village containing some half-a-dozen huts. To-day it is one of the centres of the Norwegian Hydro-Electric Nitrogen Co., which disposes of a total of 365,000 kW entirely for the manufacture of nitrogen. The Vemork station orginally contained ten Pelton turbines of 14,400 h.p. each, driving alternators, and eventually a vertical-type Francis turbine of 17,500 h.p. was added. The original Pelton runners have been rebuilt to give 16,000 h.p. each and drive two 6,000-kW d.c. generators, replacing the old alternators. The total capacity of the station is now 194,500 kW.

Saheim power station is some four miles from Vemork and is hydraulically in series with it. It contains 161,000 h.p. of turbines driving d.c. generators much in the same way as its sister station.

The second party found its way to the Nore station, owned by the Norwegian Government. This station at present supplies 100,000 kW, but will eventually have a capacity of 260,000 kW. It forms one of a group of 25 different stations whose present capacity is of the order of 500,000 kW, but with undeveloped resources of about 2 million kilowatts. Transmission of the power produced is carried out over 132-kV lines.

The following day's programme included visits to the Vamma and Morkfoss-Solbergfoss falls. The hydro-electric stations are situated on Norway's largest river whose catchment area covers a little more than one eighth of the country. It is a regulated river, and schemes are in hand for increasing the winter flow.

The total capacity of the first station is 102,000 kVA in six 12,000-kVA units and two 15,000-kVA units. One point of interest in connection with this plant is the hot-air installation. The heated air from the generators is led off in trunks and conducted to various parts of the building where it can be controlled for heating purposes. Ducts are also led to outside gear such as at the intake, and the heat is also used in connection with the oil-pressure plant for the throttle valve operation.

The second station is somewhat lower down than the first, and in this case a spillway with three roller dams is used. One of the rollers is provided with electrical heating for winter operation.

A special bypass has had to be provided, for about 10 million logs per annum are floated past this station. This bypass is provided with a special funnel-shaped intake which is capable of dealing with about 12,000 logs per hour.

Wednesday morning showed that even if the attendance at the various Norwegian visits had been large, everybody had not gone there. The intervening days between the end of the meetings in Stockholm on Saturday had been put to a very useful purpose. During that time the secretariats and staff, not to mention the printers, must have worked on one of the finest load factors ever known.

D

Contracts and Agreements.

A Brief Survey of the Legal Points and Interpretations Involved.

By H. C. PARSONS, F.I.S.A.

IN these days of intense competition and the consequent highly strung human element ever seeking a way out of some onerous or disliked bargain, a few words on the drafting of agreements and contracts generally may not be out of place.

Taking the latter first, how many people know exactly what constitutes a contract which is enforceable by law? Most business folk know when they have entered into a binding bargain that they can be sued and damages recovered from them if they do not carry out their part. A contract comprises offer and acceptance and is completed when the offer is accepted. If an attempt is made to avoid a contract, the injured party may obtain an Order from the Court for "specific performance," commanding the other party to carry out its obligations, or an "injunction" may be obtained forbidding the doing of certain acts in breach of it; both these orders can be enforced by imprisonment if disobeyed.

There is a distinction between a contract and an agreement. An agreement is an "arrangement" that has no legal liabilities, and though there may be correspondence it could not be enforced by law. Arrangements embodying "moral obligations" are not enforceable by law. Contracts may be "void," "voidable," or "unenforceable." A "void" contract is one where one party is an infant, or there has been a mistake on the part of one or both of the parties. A contract can be "voidable" at the will of one party on the grounds of fraud or misrepresentation on the part of the other, and a contract may be unenforceable through some legal ruling or technicality.

Not infrequently the final terms of a contract are vague and uncertain, and leave loopholes for the evasion of responsibilities. There may have been unconfirmed telephone conversations between correspondence. The law will not recognise as a contract anything that is vague or uncertain. With regard to contracts entered into by letter, an offer by letter remains open for acceptance within the limit of time stated by the offerer, or for a reasonable time, or until revoked, provided in the latter case it has not been accepted by the party to whom it was made before revocation was communicated to him. Acceptance is complete when the offerer has posted his letter accepting the offer even though it may be delayed in the post. Should a letter revoking the offer cross the acceptance in the post the contract is still binding. Business transactions are often carried on by means of inconclusive forms of acceptance. The acceptance of a counter-offer by the offeree becomes a binding contract on acceptance by the original offerer; an offer once refused, however, cannot be revived except at the will of the original offerer.

Contracts may be divided principally into four classes: Contracts under seal; contracts required to be in some special legal form; contracts requiring no special form at all; and contracts of record.

The first and last are called formal contracts, the others simple. Contracts under seal need no special discussion, and contracts of record are not common to ordinary business transactions. Simple contracts are subject to a limitation period of six years, but the right of action on a deed exists for 20 years. With regard to contracts required by law to be in some special form, these are not common in our own industry.

Section 4 of the Statute of Frauds provides that the following contracts cannot be sued upon unless the parties thereto signed some memorandum embodying it:—(1) The promise of an administrator (or executor) to pay damages out of his own pocket; (2) an agreement in consideration of marriage; (3) a contract for the sale of lands; (4) a promise to answer for the default or debt of another; and (5) a contract not to be carried out for 12 months.

With regard to (1) it is important to note that an administrator or executor is not liable for damages or expenses beyond the assets of the deceased. With regard to (3), these are now subject to the provisions of the Law of Property Act, 1925, and must be in writing. Contracts under (5) are not often met with, and need not be considered here.

Regarding the form of contracts, it is very important that the names of the parties shall appear in writing, as also must the consideration for the contract and all the conditions; verbal evidence of terms or conditions not in the memorandum of contract will not be acceptable at law. The memorandum may take the form of one document or it may consist of a collection of letters and papers, but it must be complete, and must be signed by the party liable or his agent.

Probably contracts for the sale of goods are the best known to our readers. The Sale of Goods Act, 1893, Section 4, provides that all contracts for the sale of goods over £10 must be in writing unless delivery of the goods has been made or part of the purchase price paid. This Act covers two kinds of contracts: (*a*) A contract to sell, and (*b*) an agreement to sell, both of which must be in writing. As regards (*a*), the right to the actual goods passes to the purchaser on the sale, and the vendor can only sue for the agreed price; he cannot demand the goods back. In the case of (*b*), ownership does not pass. If the goods sold are not in a deliverable state when sold, it is not a contract to sell, but an agreement. For instance, if a seller sells a quantity of scrap iron, that iron is not the property of the purchaser until it is in a deliverable state, *i.e.*, separated from the main quantity.

The law of agency has a very important relation to contracts, as it is a very common thing to enter into a contract through an agent. Agents must disclose everything to their principals; also if an agent enters into a contract, the third party with whom he enters into the contract can sue the agent, the principal, or both. The practice is growing, however, in the case of motor-car companies selling motor cars through so-called agents, of ignoring the law of agency, the purchaser of a motor car in the majority of cases being unable to sue the manufacturer.

Forms of agreement vary, and people who enter into them day by day need to give them careful reading; some contain very harsh clauses which may lead to unexpected and serious liabilities. The writer has not attempted to do more than point out some of the everyday problems relating to contracts; any serious point should, of course, be referred to a solicitor, preferably one with experience of common law and industrial problems.

Pulverised-fuel Firing.

A review of the progress made in the combustion of powdered coal, as indicated by the report for 1928-29 of the Prime Movers Committee, Engineering Section, of the National Electric Light Association of New York.

By VERNON WALKER, A.M.I.E.E.

THE report on pulverised fuel issued by the Prime Movers Committee, Engineering Section, has just been issued by the National Electric Light Association of New York, for the year 1928-1929, and a review of the progress made in this method of combustion, gathered from the report, will be of interest to boiler-house engineers in this country. There is again, as in the last year's report, 1927-1928, a decided trend towards the adoption of the unit mill installation. This is very clearly shown by the following figures, which give the boiler horse-power under contract in January, 1929, and installed in 1928.

Public Utility Installations.

System.	1929.	1928.
Unit	38,000 ...	27,600
Central	22,000 ...	11,600

Industrial Installations.

System.	1929.	1928.
Unit	54,000 ...	32,000
Central	6,000 ...	34,000

Mills having a capacity of 15 tons are being used by several companies, and 25-ton mills are used by one steam corporation. The increased use of water walls continues, and large boilers having refractory walls only operate under special conditions, such as burning anthracite coal, coal with a high ash-fusion point, or bituminous coal at moderate rates of furnace heat liberation. The direct-fired installations now operate on a wide variety of types and sizes of boiler, and under a wide range of conditions, especially with regard to coal. Horizontal turbulent burners giving a short flame and complete combustion with a minimum of space, flame travel, and excess air, are being used for the average class of fuel. For burning low-volatile coal the vertical-flame type is often used, it being considered desirable for the flame to have a long travel and a lower velocity in this case. A high degree of pulverisation is also needed to prevent a high carbon loss and ignition troubles. Turbulent forced-draught burners firing vertically downward has been found to suit the furnace conditions of the bent-vertical-tube type of boiler, the flame in these cases having a natural tendency to fill the furnace. The burners are generally not constructed for high temperatures of the primary air, the average temperature being 200 deg. F.; in one case only is 350 deg. F. reached. The high temperature has in some cases caused trouble by coking the coal in the burner tips. Tangential or corner firing has also developed, all the air for combustion being admitted through the burner, either as primary air with the coal, or as secondary air around the fuel nozzle. In the earlier burners of this type the coal could be distinguished beyond the burner, but combustion now appears to be completed in a very short distance from where the flames impinge on each other. This is important when furnaces of small dimensions are being considered. Should a low-volatile coal be used, auxiliary-air inlets are provided in the furnace front wall. It would appear that generally a larger range in burner capacity is needed, which is limited at present to $2\frac{1}{2}-1$.; this would prevent, on the reduction of load, the shutting down of feeders and corresponding burners in the central system, and a mill and burner in the unit system. Small auxiliary burners capable of dealing with low outputs are installed in some of the larger storage systems, the adjustment of these burners being by dampers controlling the air induced around the burner itself. As the burners are relatively small, their range of operation need not be wide, fluctuations being carried out by cutting out individual burners.

The mean of the average B.th.u. liberated per cu.-ft. of furnace volume for the central system is 12,200, and the mean of the maximum figures given is 18,100. Corresponding figures for the unit system are 15,800 and 26,600, respectively. The average boiler efficiency, including banking, &c., for the central system is 81 per cent., the corresponding figure for the unit system being 78 per cent.

The removal of ash is accomplished either in the dry or liquid state. With the hopper-type furnace the ash will mostly slide down the smooth cast-iron blocks which cover the tubes forming the hopper floor to the ash pit, but should the temperature become higher than the fusion point of the ash, it will run down the hopper in a molten condition, and after dripping into the ash storage system it can be removed by water pressure jets. The slag-type of furnace, in which no provision is made to chill the ash, has been brought into increased use during the last year, a representative installation being the 75,000-kW extension of the Charles Huntly station of the Buffalo General Electric Co., which has four boilers with slag-tap furnaces. The furnace floor is supported in these furnaces on a steel plate, and it consists of three courses of fire brick covered with a suitable material, such as burned dolomite or slag on which the molten ash accumulates. The floor plates are sealed to the side walls to prevent slag leakage, special care being taken where relative movement occurs between furnace walls and the floor. The underside of the bottom of the furnaces in some cases forms a plenum chamber which supplies secondary air to the burners. Solid slag has a very low heat transmission coefficient, which makes it a good heat insulator for the floor of the well. Where slag runs from slag spouts into the open air, it has been found that the outer part of the stream congeals and the flow continues through the centre, forming a tube. The slag is readily granulated on coming in contact with jets of water which deliver it to a water-sluicing system, a pressure of 100/140 lb. per sq. in. being used at the sluice jets. Complete combustion is aided by locating horizontal burners near the bottom of the furnace, the distribution of the flames being across the entire area of the lower part of the furnace, which permits of a good flame travel before reaching the boiler tubes, and also serves the purpose of concentrating the heat in the lower section of the

furnace, thereby keeping the ash at the bottom in a liquid state. Some 10 or 11 tons of molten slag can be easily tapped in an hour, and it is only usually necessary to remove the ash once every 24 hours. The system, besides being a clean method of removal, has the additional advantage that it collects more ash in the furnace than that maintaining the dry state. With the dry ash removal, only 20 to 30 per cent. of the ash remains in the furnace. Difficulty has, however, occurred, when using coal having a fusion point of from 2,400 to 2,800 deg. F., in tapping the slag, it being difficult to start the flow. Mixing coal of a lower ash-fusion point permits ash in the fluid form, or adding a fluxing agent has the same result. Tests are being made to discover suitable flux materials and methods of putting them into the furnace. All slag-tap furnaces are water cooled, as no refractory will stand the high temperatures necessary with this type of furnace. Refractory blocks generally cover the wall tubes above the well. Up to 77,800 B.th.u. per cu. ft. of furnace have been liberated in this type of furnace, and a maximum of 1,000,000 B.th.u. has been attained; this includes the portion of the furnace below the burners only.

Although difficulties have occurred with the venting of the system and the washing of flue gases, there appears to be no difficulty with regard to sulphur fumes. Several companies have arranged to discharge their bunker vents into the furnace, and mill drying has eliminated visible dust discharge from steam and waste-heat dryers. Users of wet gas washers report severe corrosion as the result of acid in the water. The Lakeside station of the Milwaukee Electric Railway & Light Co. has installed auxiliary cyclones on its 20-ton Raymond mills. The exhauster for these mills is on the clean side of the pulveriser, and the ordinary vent has been removed and the discharge taken to a small cyclone. The pressure is sufficient to force the vented air at this point through the small auxiliary cyclone, and thence to the pulveriser-house roof.

Coal removed by the small cyclone is returned to the top of the mill, a current of air being induced downwards through the apex of the cyclone by the suction of the mill, which is in the neighbourhood of −9 in. A 1½-in. orifice at the base of the cyclone limits the amount of air re-circulated in this way. Generally it is found that cyclones work better at heavy load, due to increased velocity. Water washers have the best performance at light loads. Low fusibility of ash does not occasion much trouble, in view of progress made in the development of furnace design, refractories being replaced by water-cooled walls. It is found that it is generally advisable to increase the excess air as the boiler rating is increased; the furnace temperature may become excessive from a given point, and if refractories are fitted, even over water walls, they commence to run, and slagging of the front boiler tubes also commences. A gradual increase in excess air therefore becomes necessary. Again, at very light loads excess air may be necessary to prevent smoke. The removal of tubes in the front bank of tubes to form a slag screen has met with success in some cases.

Boiler availability is given as between 60 and 95 per cent., and this factor expresses as a percentage of total time, the time during which a boiler is available for service. The outage of boilers working at lower rates of heat transmission appears to be in excess of those working at comparative higher rates. The automatic control of pulverised-fuel boilers has not made the progress which was expected, although several large concerns indicate that better operation is obtained with automatic control than can be obtained manually.

During the last few years it has been demonstrated that the successful application of pulverised fuel in Great Britain calls for different treatment than is necessary in the U.S.A. Messrs. Babcock & Wilcox, Ltd., in their contribution to the data given, point out that British coals are generally harder and contain a higher percentage of ash than other coals, and frequently contain a considerable amount of sulphur as pyrites. The initial moisture of the coals is also high, being frequently 18 per cent. and rarely lower than 8 per cent.; this means that considerable drying equipment becomes necessary High humidity of the atmosphere causes the greatest difficulty by the absorption of moisture by the pulverised fuel. The unit-fired system has the advantage in this respect, and the latest installation of this kind at the Lister Drive power station of the Liverpool Corporation consists of four mills per boiler. The boilers are capable of evaporating 125,000 lb. per hour, and have a heating surface of 14,777 sq. ft.; they are also fitted with economisers and air heaters. Calumet burners are used in conjunction with Bailey water walls. At the Dunston power station of the Newcastle-upon-Tyne Electric Supply Co., Ltd., a Babcock & Wilcox low-temperature carbonisation plant is now in operation,* the residual semi coke being burnt in pulverised form under a boiler of 5,486 sq. ft. of heating surface. The boiler has three refractory-covered water-cooled walls, the front wall being of solid construction. The residual fuel contains only 15-19 per cent. volatile matter, and fine pulverisation is essential under these conditions. The low-temperature carbonisation plant gives approximately 14 cwt. of smokeless fuel per ton, while the by-products include 4.7 gallons of light oil and 14 gallons of dry tar per ton. The stripped gas is also fired into the furnaces.

The position of pulverised fuel in relation to marine work has developed favourably during the year. Several large cargo boats are now fitted to burn pulverised fuel alone. The plant installed on the Blue Star liner *Stuart Star*, plying between the Tyne and Buenos-Aires, by Messrs. Clarke, Chapman & Co., Ltd., has been watched with much interest, and good results have been obtained. The equipment consists of two single-ended and two double-ended four-furnace Scotch-type boilers with 3,926 sq. ft. of heating surface, the combustion space being 61 sq. ft. Twelve furnaces out of the twenty-four were fitted to burn pulverised fuel after the first trip, for which only one boiler was fitted. Northumberland smalls of 12,900 calorific value, 13 per cent. ash, and 2 per cent. moisture have been used; the boiler efficiency was 80 per cent., and 15 per cent. CO_2 was obtained against 3 to 9 per cent. CO_2 with hand firing. A saving of 2 tons of coal per day is reported.

There is generally not a ready market for the inferior class of fuel, which in most cases is the refuse from cleaning the better quality. Whether trading vessels fitted with pulverised-fuel equipment can take advantage of this market depends on the freightage. If this is high the percentage of saving drops considerably. Larger bunker space is also required, and may amount to 2 per cent. Sweeping assertions should not therefore be made for or against pulverised fuel for marine purposes. Each individual case must be examined carefully in order to see that a commercial success is obtainable.

The need to-day in the construction and application of pulverised fuel is the elimination of every unnecessary part and complication in the systems employed. This again will eliminate space which has always been a drawback to pulverised fuel wherever it has been employed.

* Electrical Review, October 5th, 1928.

Electric Industrial Trucks for Hospitals.

The latest application of electric industrial trucks in Germany is in connection with hospitals, where they are now being used for the movement of invalids and sick persons from one part of the building to another and also for the transport of food from the kitchens to the different wards. For the last-named purpose trucks with flat platforms which can be hydraulically raised and lowered are employed. The food is loaded up into special van bodies divided into compartments and provided with four legs, each terminating in a small wheel. The truck is backed under the van, the latter then being lifted clear of the ground by means of the rising platform. Once arrived at the particular ward, the van is again dropped to the ground, and by means of its own wheels it can be readily pushed slowly along from room to room.

Electricity for the Home.

An account of the progress made by the Birmingham Electricity Undertaking in domestic electrification.

In the past two or three years considerable progress has been made in the field of domestic supply by the City of Birmingham Electric Supply Department. Whilst much of this development is attributable to the growing knowledge and education of the public generally through the country in the uses of electrical apparatus, the main reason is undoubtedly the progressive policy of the department. Any substantial development is, of course, dependent upon low prices of energy and upon facilities for the hire and hire-purchase of installations and apparatus. The ordinary lighting rates in Birmingham vary from 4½d. to 2¾d. per kWh, and the power, heating, and cooking rates from 1½d. to 1¼d., according to consumption. The Department, however, appreciating the necessity of simplifying wiring arrangements and stimulating the development of the domestic supply generally, introduced an inclusive domestic contract tariff in September, 1927, the fixed quarterly payments being subject to a running charge of ¾d. per kWh. More recently a special rate of ½d. per kWh has been introduced for current supplied for domestic water-heating apparatus, mainly to encourage this valuable "off-peak" load. With such rates as these considerable domestic development was bound to take place.

Figs. 1 and 2.—Alcove, showing Thermal-storage Water Heaters, Modern Lighting Fittings, etc., in Paradise Street Showroom.

In December, 1923, a decision was come to by the Corporation Housing Committee to install electric lighting in all houses erected on the municipal housing estates, and orders for 31,000 municipal houses have since been dealt with.

For many years past no difficulty has been experienced in this district in persuading builders to wire for lighting houses erected under private contracts, and many are now also installing power plugs as a matter of course. It is only a question of time before builders will provide an ample number of power plugs in all new houses to meet modern domestic requirements. The number of new consumers connected to the mains now exceeds 1,000 per month, and the total number now on the supply is upwards of 82,000.

Under the assisted wiring scheme launched last year complete installations are provided by the department, under agreement providing for quarterly instalments, or, alternatively, through prepayment meters, by an addition of 2½d. per kWh for lighting purposes and 2d. for each eight kWh used for power purposes, until paid for. A unique and popular feature of the scheme is that consumers are given freedom of choice of fittings, shades and lamps, which are supplied from the Department's showrooms, the wiring being done by registered contractors. The numbers of orders placed are growing each month, and up to the present over 1,600 installations have been dealt with.

The striking development now proceeding in heating and cooking is shown by the fact that 20 per cent. of this load has been added during the past year, and the total connected load is now more than double that at January, 1928. This development, besides improving the diversity factor, has substantially increased the earning capacity of the mains, and thereby justified its cultivation. Furthermore, the ratio of the heating and cooking load in comparison with the lighting and motive power connections, as shown in the diagram in fig. 3, has been improved.

On March 31st, 1923, the heating and cooking load represented 2.8 per cent. of the total connections, whereas on the same date this year the percentage had increased to 12.8 per cent., which is evidence that much spadework in the past is now bearing fruit. The following table gives particulars of the connections of domestic apparatus up to March 31st, so far as records are available.

Recorded Domestic Connections at March 31st, 1930.

Apparatus.	Connected during year ended 31st March, 1930. No.	Kilowatts.	Total connected March 31st, 1930. No.	Kilowatts.
Fires	2,298	4,691	15,024	29,444
Cookers	546	2,984	1,700	8,707
Irons	755	237	3,609	1,511
Water heaters ...	84	217	167	508
Other apparatus ...	814	297	4,390	2,323
Total ...	4,497	8,426	24,890	42,493

The department has large showrooms at 21, Paradise Street, Birmingham, figs. 1 and 2, adjacent to the Town Hall, in which demonstrations of special appliances are held at frequent intervals, and each Wednesday there is a weekly demonstration of electric cooking. The windows are dressed fortnightly, and every endeavour is made by changing the style as well as the articles shown, to make the displays attractive in order to secure the attention of passers-by. Special seasonal displays undoubtedly boost up the sales of particular appliances. A branch showroom has been opened in Solihull, fig. 4, to meet the needs of this rapidly growing suburb, and another has been opened at Harborne; sites are also being obtained in other suburbs. The total area of supply, including the rural districts of Warwickshire served by the Department, is 192 sq. miles, and to deal with the rapidly growing business in the outer suburbs the equipment of additional showrooms is under consideration. The keynote of modern salesmanship is *service*, and the Department is fully alive to the necessity of giving the best possible service to consumers with a view to increasing business.

The hire of cookers is a comparatively recent venture, so far as Birmingham is concerned, but they are being installed at the rate of 500-600 per annum. The improved type of hot plates now supplied has removed complaints of slow boiling. If not more than 30 feet of wiring is required from the service cutouts to the cooker

Fig. 4.—Exterior View of Solihull Branch Showroom.

point it is carried out free by the Department. The rentals range from 4s. to 8s. 6d. per quarter, according to the model supplied. The majority of cookers sent out on hire are "Creda," "Revo" and "Jackson," with loadings rangings from 4.25 to 6.8 kW.

As regards other domestic appliances, articles costing £4 or more can be secured on hire-purchase terms spread over one, two, or three years. This scheme is proving very popular, and has considerably increased the turnover of the showrooms.

Excellent cash sales have been effected with vitreous-enamelled fires in different colour finishes. Bowl fires of various makes sell well, as also do irons. There is a

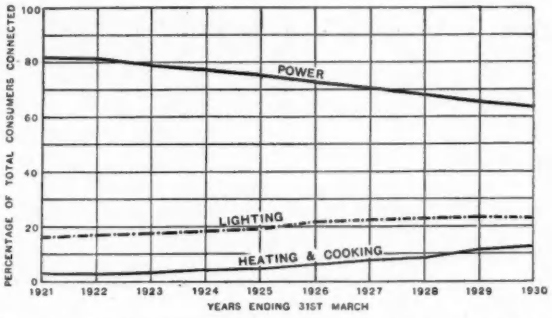


Fig. 3.—Percentage of total connections of (1) Lighting, (2) Heating and cooking, and (3) Power loads.

growing demand for water heaters on the thermal-storage principle, and also for immersion heaters in existing hot-water systems. The general policy is to push tried goods of British manufacture which are supplied under a maker's guarantee.

The Department appreciates the advantage derived from equipping stands at popular local exhibitions, which, apart from the direct business secured, does much to arouse the interest of the public in the new apparatus shown, and helps to spread the "electric idea." Already this year, space has been taken at the Brighter Homes Exhibition, Birmingham, and at the British Industries Fair, Castle Bromwich, whilst recently an attractive display was staged at the National Trades and Industrial Exhibition.

Much of the new business obtained is attributable to the increased attention given to publicity. Advertisements describing the activities of the Department are inserted in local newspapers, magazines, &c., from time to time; slogans are printed on the undertaking's stationery; leaflets, circulars, &c., are sent out to interested parties; and attractive handbills are enclosed with the quarterly accounts. It is by making the most of these opportunities, followed up by personal canvasses, that the best results are obtained.

It is of prime importance that all sections of the electrical industry should work together in a spirit of harmonious co-operation, and the Department has made a point of cultivating friendly relations with the local manufacturers, wholesalers and contractors. Meetings with representatives of the local branch of the E.C.A. are held from time to time to discuss matters of mutual interest. The Area and Local Sections of the British Electrical Development Association movement in this district, of which Mr. E. J. Jennings, secretary and commercial manager of the Birmingham undertaking, is honorary treasurer, and Mr. W. Y. Anderson, commercial engineer, is honorary secretary, are vigorous bodies, and have done much towards the development now taking place. In March last a three weeks run of an "All-Electric" house in Harborne was so successful that a series of demonstration houses is being arranged in other suburbs. Acknowledgment must also be made of the enthusiastic support of a strong local branch of the Electrical Association for Women.

The price of gas in Birmingham is 7.79d. per therm, equivalent to 3s. 1d. per 1,000 cubic feet, and full facilities are afforded for the hire and hire-purchase of all kinds of gas appliances. In spite of the keen, albeit friendly, competition of the two Departments, the activities of the electricity undertaking are successful in securing an ever-increasing share in meeting the heating and cooking requirements of the community of Birmingham and district

Parliamentary News.

[By our Special Parliamentary Reporter.]

Transatlantic Telephone Traffic.

On July 22nd Mr. H. B. Lees-Smith, the Postmaster-General, informed Mr. Day that the number of telephone calls between the United States and Great Britain was 546 in April, 676 in May, and 641 in June. The average chargeable duration of these calls was 6½ minutes each. They were all dealt with by the Post Office wireless station at Rugby and its receiving station at Baldock.

Wireless " Exchanges."

On July 22nd Mr. D. G. Somerville asked the Postmaster-General how many wireless " exchanges " there were in this country, the towns where they existed, the number of subscribers to them, and the advantages these received.

Mr. H. B. Lees-Smith said that on June 30th last there were 56 systems with a total of 12,172 subscribers. The principal towns concerned were: Blackpool, Bradford, Braintree, Brighton, Burnley, Clacton-on-Sea, Ely, Frinton-on-Sea, Hull, Hythe (Hants.), Luton, Lytham-St. Annes, Portsmouth, Ramsgate, Swindon and Thetford. For relatively small weekly payments the subscribers obtained reception of wireless programmes at loud-speaker strength and were saved the expense and trouble attaching to the purchase and upkeep of separate receiving sets.

Power Line over an Aerodrome.

On July 23rd Mr. Mander asked the Minister of Transport if he was aware that the proposed aerodrome of the Wolverhampton flying school at Blackhalve Farm, Wednesfield, was threatened by the proposal of the Central Electricity Board to erect an overhead cable passing over the site; and whether he would take the necessary steps to arrange for a deviation.

Mr. Morrison said he was generally aware of the matter referred to, but no application for his consent to erect the overhead line had yet been made. If an application was received he would consult the Air Ministry before coming to a decision.

Joint Electricity Authorities.

On July 23rd Mr. Ede asked the Minister of Transport in how many parishes a Joint Electricity Authority had exercised its power under Section 12 (1) of the Electricity (Supply) Act, 1919, to supply electricity, and the approximate population of such parishes; and how many parishes there were in respect of which the Electricity Commissioners had, under Section 12 (1) (iii) of the Electricity (Supply) Act, 1919, exercised their powers to impose on a Joint Electricity Authority an obligation to supply electricity, and the estimated population of such parishes.

Mr. Morrison replied that of the four Joint Authorities which had been created under the 1919 Act, only three had powers of the nature referred to. The position in the London district was that only two parishes were outside the areas of authorised distributors. The West Midlands Authority had submitted to the Electricity Commissioners proposals for furnishing supplies in an area of approximately 109 square miles with a population of 67,000 inhabitants, containing 62 parishes including five urban districts. These proposals had been approved in principle and the draft Order was under discussion with the Joint Authority. The North-West Midlands Joint Authority, which was only constituted last year, was under a similar obligation to submit proposals to the Commissioners. It had already submitted a scheme for supplying in two parishes and further proposals were in active preparation.

Unemployment and Electrical Development.

On July 23rd, during the debate on the second reading of the Unemployment Insurance (No. 2) Bill, which increases the borrowing powers of the Unemployment Insurance Fund by £10,000,000, Mr. Owen, a Liberal member, said that this money would have gone far to finance a loan for development schemes. Through the development of electricity, he said, a revolution might be brought about in the countryside. Our most formidable competitors in the world had the advantage of cheap and abundant electrical power. They had it mostly through hydro-electricity. There were only two great areas in this country in which hydro-electric developments were possible—one being the Clydeside area and the other those counties which surrounded the Severn Valley. One would have thought that a Government so hard pressed would have put in hand great schemes of hydro-electric development, but the best that it could do was to appoint another committee of inquiry. The one first-class measure which the Government had passed had been one to put the coal industry in a strait-jacket at the very lowest point of its production—a measure which made no provision whatever for the expanding electrical industry, nor for supplying the industry with the small coal which to-day was the most remunerative part of the coal industry and which under an intelligent development might be most profitable.

Public Works Facilities Bill.

On July 23rd, during the Committee stage of the Public Works Facilities Bill, which provides for the acceleration of schemes put forward by local authorities for the relief of unemployment and other matters, Sir Douglas Newton called attention to the provisions of Clause 2, which gives the Minister powers to make Orders authorising local authorities and statutory undertakers to purchase land compulsorily where required. He asked if the powers would enable electrical undertakers to acquire a site both cheaply and expeditiously.

Mr. Morrison said that such powers were conferred by Clause 2.

On Clause 5, Mr. Womersley pointed out that it dealt with the Special Orders made by the Electricity Commissioners. Under the Act of 1919, before the Commissioners could take possession of certain land for the purpose of laying down their electric cables, they had to hold a public inquiry, so that objections could be heard. Apparently that was altered altogether in Clause 5. The Commissioners were obliged to inform those whose rights were affected under a Special Order that certain things were to be done. Those people were then empowered to write to the Electricity Commissioners stating any objections that they had. The Commissioners then had to agree to the objections or refuse them, and report to the Minister. The latter would then communicate with the objectors, who could again make their objections. Then absolutely the last word rested with the Minister, and it was not necessary to have a public inquiry. He asked for further information on this point.

Mr. Morrison, in reply, said there was no change in the existing procedure up to the point at which the Order reached the Minister for confirmation. All the rights of the objectors were preserved up to that point. But there was a class of unopposed Special Orders that were made after considering in writing various objections made by the Commissioners, and they then became unopposed Special Orders, but the Minister was bound, nevertheless, to delay confirming the Order for 21 days, for receipt of objections. The Order had then to be confirmed by the two Houses. Such Orders were not always confirmed automatically. In the House of Lords there was a still more elaborate procedure, and these Orders could take 15 or 18 months in all to get through. That was indefensible, particularly where no great point of contention was involved. In the great majority of cases, Special Orders were not opposed. Out of 57 Orders made last year, 48 were not opposed, and, in such cases, applications to publish intention to confirm and receive objections was a needless waste of time. There were only four cases where the Minister would be able to dispense with this procedure. First, where there were no objections; secondly, where objections had been withdrawn; thirdly, where outstanding objections appeared to be frivolous; and fourthly (and this was where the real change occurred) where any outstanding objection appeared to have been removed by amendment made by order of the Commissioners. That was not a particularly revolutionary change.

Electrification of Essex Lines.

On July 28th Mr. Muggeridge asked the Minister of Transport if he could say if travelling facilities from the City by the two railways from Liverpool Street and Fenchurch Street to Romford and Upminster, respectively, were likely to be improved; and if he had information showing when the promised doubling or electrification of these overcrowded routes was expected to be completed.

Mr. Herbert Morrison said he understood that the London and North-Eastern Railway Company was widening its line between Romford Junction and Gidea Park, and that the London Midland & Scottish Railway Company was undertaking the widening and electrification of its line between Barking and Upminster. He was consulting the railway companies as to the probable date of the completion of the work.

Adjournment.

Parliament was to adjourn for the summer recess to-day (Friday) or to-morrow. The date of re-assembly is October 28th.

Noise Problems in Electrical Plant.

Descriptive leaflet No. 13/0-1 recently issued by the Metropolitan-Vickers Electrical Co., Ltd., contains a reprint of an article on " Noise Problems in Electrical Plant and Apparatus," by Mr. B. G. Churcher, from the *Metropolitan-Vickers Gazette*. The article is intended as an introduction to the consideration of the noise arising in the operation of electrical plant and apparatus. No attempt is made to deal with noise problems arising from particular types of apparatus, but attention is drawn to general considerations which arise in the choice of plant for a given service and in the investigation of all noise problems. The procedure adopted by the Metropolitan-Vickers Electrical Co., Ltd., in dealing with the subject, the acoustics laboratory built for the work, and the apparatus developed for the quantitative measurement and analysis of complex sounds, are briefly described. Results of noise measurements are given by way of illustration. In our issue of November 15th, 1929, p. 876, we published a summary of a paper by Mr. Churcher and Mr. A. J. King, bearing on the same subject, which was read before the Institution of Electrical Engineers.

Exhaust Turbo-electric Propulsion.

Notes on the Equipment of the S.S. "City of Barcelona."

THE latest Ellerman liner *City of Barcelona* is of special interest to both the shipbuilding and the electrical industries, in that it is claimed to be the first new ship to be fitted with exhaust turbo-electric propulsion equipment. This system, which is one of the most notable recent developments in ship propulsion, utilises energy in the steam exhausted from a main reciprocating engine to drive a turbo-generator set, the output of which is applied to the propeller shaft by means of a motor mounted upon it. An important gain in efficiency is thus obtained which can be applied to give increase of speed, reduction of fuel consumption, or a combination of the two. Other important effects are a steadying influence on the reciprocating engine, elimination of racing, and an increase in the efficiency of propulsion.

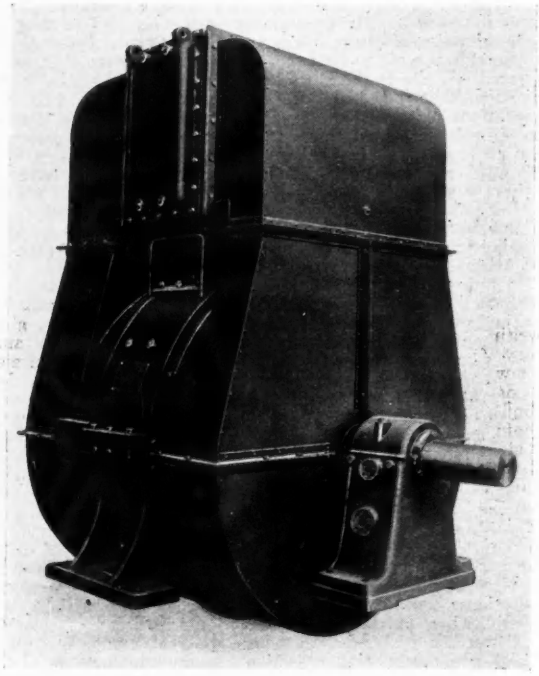


Fig. 1.—The Generator with its Air-cooler.

The first development of this type of equipment was made by the Metropolitan-Vickers Electrical Co., Ltd., in collaboration with Mr. W. Hinchcliffe, chief superintendent engineer of the Ellerman Lines, Ltd. The first installation was completed some six months ago on the *City of Hong Kong*, and it attracted considerable attention, not only because of its novelty, but also because of the excellent results obtained.* The sea trials showed a saving of 23 per cent. in steam consumption, and still better results have since been obtained by the equipment in normal service on the Indian trade route. Following on the *City of Hong Kong* the *City of Barcelona* is the first of five other vessels to be completed with this type of equipment, the remaining four being conversions.

Built by Messrs. Barclay, Curle & Co., Ltd., on the Clyde, the *City of Barcelona* is a single-screw cargo vessel designed with special reference to the transport of large locomotives. Her overall length is 444 ft., breadth 58 ft., and depth to the main deck 29 ft. 9 in. Her gross tonnage is 5,600, and her deadweight carrying capacity is 9,500 tons. The main engine, which was built by the shipbuilders, is a four-cylinder triple-expansion engine having one h.p., one i.p. and two l.p. cylinders, and a stroke of 48 in. Steam is supplied at 265 lb. per sq. in. and 180 deg. F. superheat, and controlled for each cylinder by admission and exhaust valves of the double-poppet type, actuated by Beardmore Caprotti valve gear. It is claimed for this type of valve gear that not only does it give an ideal distribution of steam for all conditions of load, but also that it permits a wide variation of the cut-off without disturbing the other functions of the valve, a characteristic which renders it particularly suitable for an engine exhaust-steam turbine combination.

It is a feature of importance that with the electrical exhaust turbine system the absence of mechanical connection between the turbine and the propelling shaft allows the position of the turbine to be arranged as best suits all the required conditions. In this case the generator set is mounted on a platform on the port side of the engine room at about the level of the cylinders of the engine. The exhaust steam from the l.p. cylinders of the engine is passed through two "Supreme" vortex steam separators and is admitted to the turbine through a by-pass valve and an isolating valve. The by-pass valve serves to connect the engine exhaust either to the tur-

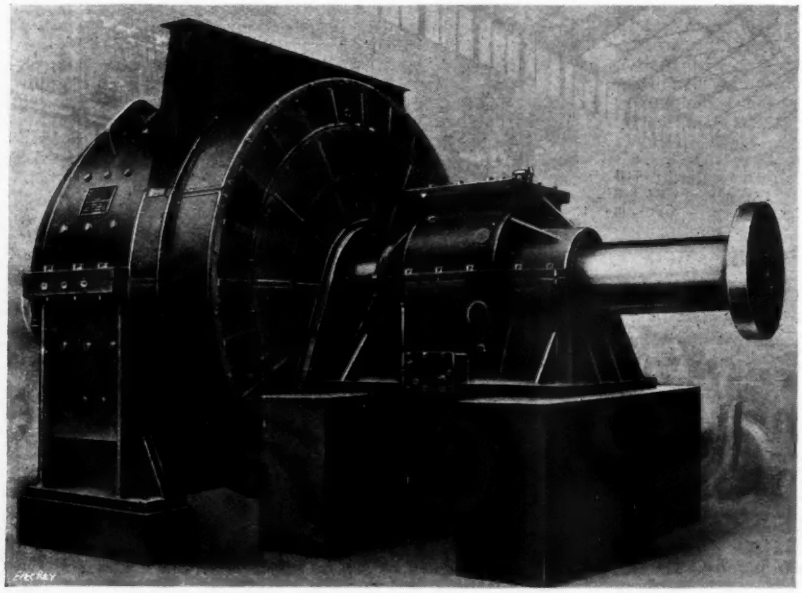


Fig. 2.—The Propulsion Motor.

Fig. 3.—The Control Cubicle.

* See "Electric Ship Propulsion," Elec. Rev. April 25th, 1930.

bine or to the condenser, and is specially designed to give a low pressure drop. The steam connections to the turbine are made on the underside, which facilitates inspection, as the turbine may be opened up without breaking steam-pipe joints or moving heavy sections of piping. In addition to the exhaust steam supply to the turbine, arrangements are made by which live steam at reduced pressure can be supplied direct to the turbine, so that in the event of the main engine being disabled the turbo-electric plant is available for propelling the ship either ahead or astern. Under these conditions a speed of 6 or 7 knots may be maintained.

The turbine is of the Metropolitan-Vickers impulse type, 3,000 r.p.m., driving through a 3 to 1 reduction gear two d.c. generators, main and auxiliary, which together give the plant the characteristics required. The main generator, shown in fig. 1, is of particular interest with regard to its cooling arrangements. The ventilation of the machine is arranged on a closed-circuit system, the air being circulated by a fan on the armature shaft and cooled by sea water in a tube-type cooler mounted on the generator yoke. The circulation of water through the tubes of the cooler is maintained by the main circulating water pump. The propelling motor is situated in the thrust recess, immediately aft of the main engines, although in the *City of Hong Kong* it is situated towards the aft end of the shaft tunnel. The former arrangement is preferred where possible, as it centralises the plant, but the latter is advantageous in certain conversions, as it minimises structural alterations and may allow of a greater increase in speed in cases where otherwise the shaft size would impose a limitation. The motor, fig. 2, is a single-bearing machine rated at 990 s.h.p., the armature being built on a short length of propeller shafting inserted between the thrust shaft and the main line of propeller shafting, part of the weight of the armature being carried by the combined thrust and journal bearing, which is of the Michell Bearing Company's standard design. The motor is of the totally-enclosed pipe-ventilated type, with an external blower which draws cooling air from a screen intake outside the engine room. The enclosure of the machine is arranged so that the commutator is external to the air circuit, thus permitting regular inspection without dismantling.

Fig. 3 shows the control cubicle. In the centre is a single handle for starting and stopping the auxiliary propelling machinery. To the right and left of the control handle are regulator hand-wheels for adjusting the operation of the plant to suit the required running conditions. Above the regulator wheels are the indicating instruments and gauges.

The turbo-electric equipment functions automatically when in commission, and the motor is reversed with the main engine without separate control. The control of the equipment is effected by means of an oil relay system, supplied from an oil pump driven from the turbine shaft or, at starting, from a pump which is separately driven. This separately-driven pump is shut down as soon as the turbo-generator set has attained normal speed. The operation of the valves and safety features is such that so long as the pressure is maintained in the oil relay system the requisite steam valves and electrical switches are closed and the turbo-electric equipment is in commission. Release of oil pressure, either by a hand-operated control or by the action of the emergency tripping devices, immediately causes the relay-operated steam valves to isolate the turbine from the exhaust steam supply and to connect the exhaust direct to the condenser, the electrical machinery being simultaneously and automatically switched out of commission.

Following the official trials, in which the machinery operated entirely satisfactorily and enabled the guaranteed speed to be easily attained, the vessel left on her maiden voyage to India.

Business and Industrial Notes.

The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures.

France and the United States Tariff.

Our French correspondent says that the new Customs tariff adopted by the United States has given rise to much comment and criticism on the Continent, and in France a considerable amount of vexation is being expressed in technical and industrial circles at the increased charges which French exports will have to bear under the new tariff. At present it appears to be probable that some form of retaliation will be adopted, notwithstanding the fact that, as a reply to previous American tariffs, imports into France from the United States have been subjected for many years to a special scale which is much in excess of the rates applied to goods from other countries. On June 21st *La Métallurgie* expressed the view that the American tariff would probably defeat its own object by increasing the cost of living in America and thus hampering American exports, while on the other hand, European countries with their low costs would be able to compete more effectively in the world's markets. *L'Electricien* on July 15th remarked that the American authorities had pointed out that France was one of the countries least affected by the new fiscal measures, the greater part of French sales in America being luxuries against which there was no prohibitive duty. However that would not increase France's export of electrical specialities such as porcelain, and as France had recently imported a considerable amount of electrical material from America the Government possessed a means of retaliating in the defence of the French industries affected by the American tariff. With her rapid rise in industrialism and her improved financial conditions France is likely to become a still more important market for certain electrical and metallurgical articles which she does not yet produce.

New Zealand Tariff Changes.

The *Board of Trade Journal* states that many alterations have been made in the New Zealand Customs tariff as from July 23rd. The most important provision is the increase of the general tariff duties on a large number of goods by 5 per cent. *ad valorem*, the preference enjoyed by British goods of these kinds thus being increased by this amount. This increase covers, *inter alia*, electrical machinery. One of the principal changes is an increase of 25 per cent. in the general duty on electric lamps, the British preferential rate being unaltered.

Belgian Tariff Modifications.

Under the provisions of the commercial treaty between Belgium and Switzerland a number of alterations in the Belgian Customs tariff came into force on July 15th. The new duties are applicable to British goods. The duty on steam turbines weighing from 5,000 to 50,000 kg. is reduced from 168 to 156 fr. per 100 kg., and that on hydraulic turbines weighing from 500 to 5,000 kg. from 210 to 105 fr. per 100 kg. The duties on dynamo-electric machines are reduced as follows:—Weighing 5,000 kg. or more, from 120 to 108 fr. per 100 kg.; from 2,000 to 5,000 kg., from 140 to 126 fr. per 100 kg.; less than 10 kg., from 560 to 399 fr. per 100 kg. The duty on electric meters and parts is reduced from 1,200 to 750 fr. per 100 kg., and that on articles for electrical insulation (without metal parts) from 300 to 250 fr. per 100 kg. The duties on winding and covering machines and steam condensers are also reduced.

Lamps for South Africa.

H.M. Senior Trade Commissioner in South Africa reports that the South African Railways and Harbours are calling for tenders by September 8th for the supply of lamps for the 12 months ending December 31st, 1931. The tender includes the supply of gasfilled lamps, clear and half frosted, vacuum-type lamps, tungsten-filament lamps of the vacuum and gasfilled types, including clear, half frosted and either internally-frosted or opal train lighting lamps, locomotive headlight lamps and carbon-filament lamps. A copy of the specification and general conditions of tender is available for loan on application to the Department of Overseas Trade, 35, Old Queen Street, S.W.1. Local representation is in practice essential. The Department will be pleased to supply British firms not already represented in South Africa with the names of agents who may be willing to handle tenders on their behalf.

Unemployment.

There was an increase of 6,446 in the number of registered unemployed during the week ended July 14th. At that date the total was 1,939,900, as compared with 1,933,454 on July 7th, and 1,136,665 on July 15th, 1929.

Electrical Manufacturing in Russia.

In a recent article under this title (Elec. Rev., June 20th, p. 1168) we reported that the Elektrosil Works in Leningrad was now undertaking the construction of turbo-generators in sizes up to 88,000 kW and had also commenced the manufacture of mercury-vapour rectifiers. We are now able to reproduce a recent photograph of the turbine department of the Elektrosil works.

The Electro-Physical Laboratory, Moscow.

Dr. A. Crowther recently contributed an article to our pages on technical training in Russia. Reference was made to the technical institutes which had been organised in Leningrad. Our other illustration shows the Electro-Physical Laboratory of the Pan-Union Electrical Testing Institution in Moscow. This institution is to have thirteen separate buildings, eight of which have already been erected and put into commission.

Salesmanship and Languages.

The second interim report of the Committee on Education for Salesmanship (Stationery Office, 6d. net) takes the form of a study of the teaching of modern languages. The methods adopted in Denmark, Germany, Holland, Sweden and Switzerland were examined and the results are embodied in a lengthy appendix to the report. The French system is so familiar to the Board of Education that it was thought unnecessary to make further investigations in that country. The general conclusion formed by the Committee's investigators is stated as follows:—"Boys and girls entering commercial employment at about 16, which is a usual age, will probably have received instruction in two foreign languages up to an advanced stage; that is, to a point where they can use these languages for practical purposes in connection with their occupations, immediately or after comparatively little further practice. In some countries, again, a minority may have started on a third language, and those who enter on their occupation at 18 or 19 years of age will frequently have received a substantial amount of instruction in a third language. The position of course varies from school to school and country to country, but it would be quite common for a recruit of 16 to have been working for 5 or even 6 years on one language, and for three or four years on another, while those leaving school at 18 or 19 might have have had a three years' course in a third language." Emphasis is laid upon the importance of facility in speech; literature is not neglected but the importance attached to it is secondary rather than primary and this has led to a rather poor standard of "commercial correspondence." These and other matters suggested to the Committee a number of points for consideration which are set out in the third chapter of the report. The questions asked include the following:—Whether we have not something to learn from the full-time schools in the countries visited and the well-defined character of their outlook. How far we fall short of the standard set in those countries with regard to the spoken language. What is the relative importance to this country of the various languages from the cultural and practical standpoints and what provision should be made for the teaching of Spanish. If it is decided that we have deficiencies to make good to what these are due and what are the conditions of success? This must lead to a consideration of the arrangement of the curriculum, the qualifications of teachers, examination systems, the attitude of parents and the public generally and the attitude of employers. Finally the Committee asks for a consideration of the question of the function of part-time schools and what help should be given by employers and business associations in order to secure that the demand for instruction is well organised and that the instruction itself meets the needs of the employer and of the student-employé.

Electrical Supplies for Syria.

A confidential report on the market for electrical contractors' supplies in Syria has been prepared by the Department of Overseas Trade from information furnished by the British Consul at Damascus and issued to firms whose names are entered on its Special Register. United Kingdom firms desirous of receiving a copy of this report should communicate with the Department at 35, Old Queen Street, S.W.1. (Reference No. 9933.)

Westinghouse Activities in Spain.

The Westinghouse Electric International Company announces that it has joined with a group of Spanish financial and industrial leaders in the formation of a new company, known as Constructora Nacional Maquinaria Electrica and capitalised at twelve million pesetas, to manufacture electric generators, motors, transformers, and other electrical apparatus in Spain. Arrangements have been made whereby the new company will collaborate with both the Westinghouse Electric International Company and Le Matérial Electrique, the French company formed recently by Schneider-Creusot and Westinghouse interests. These arrangements secure for the Spanish company engineering, manufacturing, and research information, the granting of exclusive patent rights for Spain, and the technical guidance of the Westinghouse Company. Seventy-five per cent. of the new company's stock has been subscribed for by a Spanish group consisting of the Banco de Bilboa, Sociedad Espanola de Construccion Naval, and Sociedad Espanola de Construcciones Electro Mecanicas. The remaining 25 per cent. has been taken by its French and American associated companies. The new company has taken over the electrical business of the Electro Mecanicas organisation (which, however, retains its extensive copper interests) and has acquired from "Naval" an existing plant in Cordoba and land on which it will build a new factory in Reinosa.

Preserving Rural Amenities.

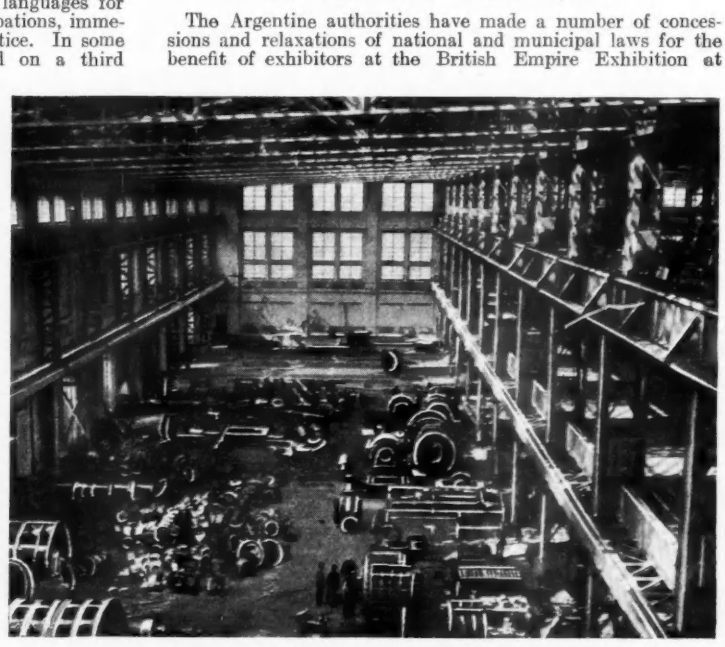
When so much discussion is taking place upon the probable effects of "pylons" and power lines upon the appearance of our countryside, it is interesting to learn from Messrs. W. T. Henley's Telegraph Works Co., Ltd., that they are now supplying *green* insulators. They are inconspicuous against foliage and have already been adopted successfully in India and in this country.

New Australian Company.

Claude Neon Lights (N.S.W.) Ltd., 52, Pitt Street, Redfern, Sydney, has been formed with a nominal capital of £100,000 to specialise in electrical illumination.—*Tenders.*

The Buenos Aires Exhibition, 1931.

The Argentine authorities have made a number of concessions and relaxations of national and municipal laws for the benefit of exhibitors at the British Empire Exhibition at Buenos Aires next year. The Customs House is allowing all goods to be imported free of duty into the Exhibition, provided they are re-exported after the Exhibition closes. The Internal Taxation Department is giving similar facilities in connection with goods subject to internal taxation. The Trade Licences Department has exempted exhibitors from the payment of any national licences whatever, and, lastly, the Municipal Council of Buenos Aires has just resolved to exempt the Exhibition from all municipal taxation.



Turbine Shop of the Elektrosil Works, Leningrad.

The Westinghouse X-ray Company.

The Westinghouse Electric Company, East Pittsburgh, U.S.A., announces that it has formed the Westinghouse X-ray Co., Inc., with a capital of $2,000,000, with the participation of two of the largest companies in the X-ray field—the Wappler Electric Co. and the American X-ray Corporation.

Electrical Tableau in a Buxton Pageant.

The accompanying illustration has been produced from a photograph sent us by Mr. A. Bishop, borough electrical engineer of Buxton. It shows an electrical vehicle entered in the recent annual pageant at Buxton by the municipal Electricity Department. The car was disguised as a summer house gaily

An Electrical Tableau at Buxton.

decorated with flowers. The structure at the rear was divided longitudinally into two sections; on one side (the side which is seen in the picture) there was an electric "kitchen" giving an opportunity for the display of nine different appliances. The other side represented a drawing room.

The Anglo-Rumanian Commercial Treaty.

Reuter reports that the British and Rumanian Governments have agreed to the terms of the commercial treaty between Rumania and Great Britain. It is understood that the terms arranged are such that British imports to Rumania will be placed on an equal footing with Continental products and in many cases will enjoy even better terms. It is stated that stringent regulations will be made to prevent Continental products entering Rumania as British goods.

Lamp Production in Sweden.

It is stated that the lamp factory of the Swedish Co-operative Association in the Hammarbyleden, Stockholm, is practically completed and that the first lamps will be supplied at the beginning of November, while the output capacity will be brought up to 12,000 lamps per day next summer. The Association has established its own wire-drawing plant, but for the present the bulbs will be obtained from the South Sweden's glass works.

Norwegian Radio Regulations.

The Department of Overseas Trade has received from the British Legation at Oslo a translation of the regulations governing radio receiving installations which have recently been issued by the Norwegian Ministry of Commerce. A copy of this may be seen at the offices of the Department (Room 43), while a further copy is available for loan to firms (in order of application) which may desire to borrow it.

Marine Engineers Visit Chloride Works.

On July 11th a party of prominent marine engineers paid a visit of inspection to the Clifton Junction works of the Chloride Electrical Storage Co., Ltd. Mr. W. F. Naylor (joint managing director) presided at a luncheon, and stated in the course of a brief speech that "Chloride" batteries had been employed in marine service for very many years; they were installed in the paddle-wheel yacht *Victoria and Albert*. Mr. Naylor claimed that nine out of ten vessels equipped with wireless carried "Chloride" batteries.

The Shop and Display Lighting Campaign.

Mr. A. Nichols Moore, chairman of the South Wales and Monmouth Area Committee of the E.D.A., presided at a meeting of members of the electrical industry in that area on July 23rd, when Mr. V. W. Dale outlined the objects of the E.D.A.-E.L.M.A. Shop and Display Lighting Campaign and the methods of carrying it out. To indicate the vast field available for electricity in the direction of better shop lighting Mr. Dale pointed out that only one shopkeeper in eight used an outside electric sign; less than one shopkeeper in a hundred made use of an illuminated facia; only one shop in ten was provided with a 100-W lamp or its equivalent, per foot run of the window; only 50 per cent. of the windows throughout the country were furnished with modern lighting equipment; only one shopkeeper in five was making use of after-hour lighting; and only one shop in twenty had illuminated showcases.

Irish Free State Electrical Imports.

The imports of electrical goods into the Irish Free State during April last amounted to £44,821, bringing up the total for the first four months of the year to £183,378 as compared with £202,122 in the corresponding period of 1929. The first four months' imports of electrical machinery are returned at £94,602 as against £139,011 in 1929.

Electrical Unemployment in Germany.

The industrial depression in Germany was emphasised on July 28th by the announcement of the Siemens and A.E.G. concerns, which employ thousands of workers, that 10 per cent. of the employés of the former will be dismissed and that the same fate awaits 12½ per cent. of the workers of the General Electric Company. The number of unemployed in Germany, which is already very great, will therefore be swollen by a large number of electrical workers. The total number of unemployed is expected to reach three millions by the end of the year. Messrs. Borsig, the locomotive manufacturers, are also reducing their staff, whilst the Bergmann electrical works has informed its employés that they will not be needed on Saturdays nor will weekly wages include payment for that day. Other smaller firms in the metal industry are expected to follow this example.—*Reuter* (Berlin).

Electrical Engineering Production.

The B.E.A.M.A. Index of Activity in the electrical engineering industry (as quoted by the *Board of Trade Journal*) shows that during June there was a substantial decline in production. With the 1924 production as a basis (100) the figure was 103.0 as compared with 110.4 in May and 106.2 in June, 1929. This caused a fall to 109.0 in the index for the June quarter from the figure of 116.4 given for the first three months of the year, but it remained above the level of the corresponding quarter of last year for which the index figure was 105.4.

Electric Lighting Sets for Canada.

The Senior Trade Commissioner, in Canada and Newfoundland, has received an inquiry for the names of British manufacturers of automatically-controlled electric lighting sets suitable for the operation of radio beacons, &c., and having an output of 2 kW at 110 V. British manufacturers of this type of generating set can obtain further particulars regarding the inquiry on application to the Department of Overseas Trade, 35, Old Queen Street, S.W.1. (Reference A.X. 9943.)

Siamese Prince Visits A.T.M. Works.

A Siamese prince, Mom Rajawongse Chua Snidvongse, recently visited the Liverpool works of the Automatic Telephone Manufacturing Co., Ltd. The prince, who is on a mission of investigation into the projected automatic telephoning of Bangkok and other towns in his native country, also inspected the Prescot and Helsby works of British Insulated Cables, Ltd., the Mersey Tunnel, and one of the Strowger automatic telephone exchanges at Southport.

Travelling Switchgear Showrooms.

Messrs. GEORGE ELLISON, LTD., were one of the first electrical manufacturing concerns to employ demonstration coaches. They have employed three of them and at the present time one is touring with an exhibition of h.p. switchgear while

An "Ellison" Demonstration Coach.

another is employed in the demonstration of mining switchgear. As will be seen from the accompanying illustration, the coaches are handsome and roomy vehicles. A special brochure has been produced in connection with the h.p. switchgear coach.

Polish Foreign Electrical Trade.

During May last Poland imported conductors, apparatus, and other electro-technical materials of a value of 5,519,000 zloty (£127,000). Poland's exports of this class were valued at 100,000 zl. (£2,300).

Bankruptcy Proceedings.

F. W. C. HOEY, wireless and electrical dealer, 29, Sicilian Avenue, W.C.—This debtor attended last week at the London Bankruptcy Court for further examination upon his affairs. He filed his petition on January 3rd last and lodged accounts showing liabilities of £5,063 and assets of £53. In March, 1926, he purchased the goodwill, stock, &c., of a wireless and electrical accessories business at the above address and traded there with another person under the style of "Scientific Appliances." The partner retired in April, 1927, and the debtor continued the business until last December when, being in financial difficulties and unable to obtain payment of a debt of £2,369 for goods supplied, he sold the business for £400, which he paid into his banking account in reduction of an overdraft. The debtor further attributed his failure to ill-health and losses by betting and gambling. After questions had been asked the examination was concluded.

M. A. MULLER, electrical goods dealer, 17, Duncan Street, Islington, N.—An application for an order of discharge was made on July 25th to Mr. Registrar Mellor at the London Bankruptcy Court on behalf of this bankrupt who failed last March. The Official Receiver reported that the liabilities amounted to £6,600; the assets had realised £71. The trustee expected to be able to pay a dividend of 1d. in the £. The applicant came here from Germany in 1922 and had traded as a manufacturers' agent and an importer and merchant, dealing mainly in German electrical goods. He attributed his insolvency to the failure of a German firm to deliver certain goods; to his liability on acceptances given to that firm; to bad debts and to loss of trade. The application was opposed by the Official Receiver on three statutory grounds and the discharge was suspended for three months.

J. H. NOBLE, 12, High Bridge, Newcastle-upon-Tyne, electrical engineer and contractor.—The public examination herein was held on July 23rd at Newcastle-upon-Tyne. The statement of affairs showed liabilities of £1,013, and no assets. The debtor stated that he began manufacturing and selling wireless sets in 1923, but this business had recently declined considerably owing to the local music dealers stocking ready-to-use sets. He had also lost money on certain house property. He admitted that he had drawn £1,413 from the business during the three years previous to March, 1930, against net profits of £1,135, but he continued in the hope that trade would revive. The examination was adjourned.

L. C. BURGESS, dealer in wireless sets, &c., 9, The Broadway, Barnes, and 244, Kensington High Street, W.—The first meeting of creditors was held on July 24th at the London Bankruptcy Buildings when accounts were submitted showing total liabilities of £6,199 (unsecured £2,574) and assets consisting of a book debt of £3,298 regarded as irrecoverable. The debtor attributed his failure to the lack of success of a company formed to acquire his businesses. The estate was left in the hands of the Official Receiver.

R. E. YOUNG, 8, Manchester Road, Swindon, wireless and electrical engineer.—The public examination was held on July 23rd at Swindon. The statement of affairs showed gross liabilities of £376 and assets of £200. The debtor stated that he commenced business last year with a capital of £35. He attributed his failure to the fact that whereas he knew the theoretical side of the business he knew nothing about the practical work and had to employ labour. The examination was adjourned for a month.

H. F. SPENCE (H. F. Spence & Sons), electrical engineer, High Street, Honiton.—Trustee, Mr. A. Collins, 28, Baldwin Street, Bristol, appointed July 21st. The following are the principal creditors:—

	£		£
Aerogen Co.	97	Haslam & Stretton, Ltd.	84
General Electric Co., Ltd.	435	R. A. Lister & Co., Ltd.	213
		Tweed & Sons	50

E. W. WOOD, 69b, Kettering Road, Northampton, electrical engineer.—Receiving order made July 18th on debtor's own petition. First meeting August 7th, at the Official Receiver's office, 6, The Parade, Northampton. Public examination, October 3rd, at the County Hall, Northampton.

COL. TEMPEST, Clayton Heights, Clayton, Yorks., electrician.—Last day for receipt of proofs for dividend August 5th. Trustee, Mr. R. Lindley, 21-22, Prudential Buildings, Bradford.

T. W. B. DURANT, electrical and motor engineer, Coit Lane, Chapelton, near Sheffield.—First and final dividend of 9s. 7d. in the £, payable July 25th at the Official Receiver's office, 13, Burton Street, Wakefield.

J. G. RITCHIE, electric lamp dealer, 54, Woodsley Road, Leeds.—First and final dividend of 5s. 4½d. in the £, payable July 31st at the Official Receiver's office, 24, Lower Bond Street, Leeds.

W. T. MONK, electrical engineer, 9, Rosedale Road, Romford.—Receiving order made July 16th on a creditor's petition.

F. M. CRANE (trading as C. S. Mayfield & Co. and the Sutton Electrical Installation Co.), 67, Carshalton Road, Carshalton, electrician.—Receiving order made July 16th on debtor's petition. First meeting August 6th, at 29, Russell Square, W.C.1. Public examination August 13th at the County Court, Croydon.

Company Liquidations.

LIGHT, POWER & MUSIC, LTD., electrical engineers and wireless dealers, Leigh-on-Sea, Essex.—At a statutory meeting of creditors on July 25th, at the offices of Mr. G. Dickinson, 82, Victoria Street, S.W., a statement of affairs was submitted which showed ranking liabilities of £437 and net assets of £187, leaving a deficiency, so far as the creditors were concerned, of £250. The issued capital of the company was £603, bringing up the total deficiency to £853. Mr. Dickinson reported that the company was registered in December, 1929, with a nominal capital of £3,000. All the shares which had been allotted were issued for cash. The company took over an existing business. It had been estimated, prior to the formation of the company, that the turnover during the first year would be £11,000, with a gross profit £3,200 and a net profit of £1,095. So far as could be ascertained, however, the turnover during a period of seven months was only £478, and there was a net loss of £323. The deficiency was attributed to the loss on the trading, alterations to premises, preliminary expenses, and depreciation written off the assets in the statement of affairs. A resolution was passed in favour of the voluntary liquidation of the company being continued with Mr. Dickinson as liquidator. A committee was also appointed consisting of the representatives of Metro-Vick Supplies, Houghton-Butcher (Great Britain), Ltd., and the Sun Electrical Co., Ltd. The following are creditors:—

	£		£
Metro-Vick Supplies ...	167	Markwick, A. D.	34
Houghton-Butcher (Great Britain), Ltd.	30	Sun Electrical Co., Ltd.	28
London Electric Wire Co.	27	British Thomson-Houston Co., Ltd.	26

ACOUSTOPHONE, LTD., radio manufacturers, 161, Vauxhall Bridge Road, S.W.1.—At a recent meeting of creditors a statement of affairs was submitted which showed ranking liabilities of £2,098 and assets of £1,601, leaving a deficiency, so far as the creditors were concerned, of £497. There were doubtful debts of £458 upon which no value was placed at the moment. The company was registered in August last year and at the date of the liquidation the issued capital was £3,702. The company had been making radio sets for large retail firms and in January it became necessary to move to new premises. The present position was attributed to the acute trade depression and to the fact that owing to other companies going into liquidation a large number of sets had been thrown on the market at low prices. The shareholders had previously passed a resolution for voluntary liquidation, with the principal creditor as liquidator. The creditors confirmed that appointment. The following are the principal creditors:—

	£		£
Vee Cee Dry Cell Co., Ltd.	55	Williams & Moffat, Ltd.	83
Universal Cabinets, Ltd.	135	Symphony Gramophone and Radio Co., Ltd. ...	105
Mullard Wireless Service Co., Ltd.	219	Celestion, Ltd.	57
		Danipad Rubber Co., Ltd.	63

SPHINX ELECTRIC, LTD.—At a meeting on July 28th a scheme was approved for the voluntary liquidation of the company with a view to reconstruction. It is proposed to form a new company with a capital of £125,000 in 250,000 10 per cent. participating preference shares and 250,000 ordinary shares, all of 5s. denomination. Of the existing shares 100,000 preference and 500,000 ordinary will be surrendered and the holders of the remaining capital will be entitled to subscribe for shares in the new company. Five preference shares credited with 4s. paid up will be allotted for each five old preference shares, and one new ordinary share credited with 4s. paid up will be allotted for each four old ordinary shares.

The adjournment of a petition for the compulsory winding up of the company is reported in our "Legal" section.

RAMSBOTTOM ELECTRICAL HEATING AND LIGHTING CO., LTD.—A meeting of creditors was held on July 16th at Ramsbottom, when a statement of affairs was submitted which disclosed liabilities of £531 and net assets of £235, leaving a deficiency of £296. Prior to the creditors' meeting the shareholders had nominated Mr. H. R. Disley, 29, Brown Street, Manchester, as liquidator. The company was incorporated in November, 1929, with a nominal capital of £500. The issued capital was £207. The present position was brought about through lack of capital, losses on contracts and bad trade. It was decided to confirm the appointment of Mr. Disley as liquidator, with a committee of inspection consisting of the representatives of Messrs. Allan Dale & Co., the Central Electric Co., and Mr. A. T. Eaves, Manchester.

MAYFAIR ELECTRIC GRAMOPHONES, LTD., 15, Copthall Avenue, E.C.—The first meetings of creditors and shareholders in this compulsory liquidation were held on July 24th. Two nominations were made for the post of liquidator—Mr. J. J. Bolt and the Official Receiver. A vote was taken and the appointment will be made by the Registrar in due course.

Enterprise Manufacturing Co., Ltd.—A meeting of creditors is called for August 21st at Johnston's Rooms, 13, The Broadway, Wimbledon, S.W.19, for the purpose of considering the appointment of a liquidator and a committee of inspection.

Ideal Wireless Co., Ltd., Dorland House, Regent Street, W.—Last day for receipt of proofs for dividend, August 5th. Liquidator, Mr. H. J. Eldridge, 133, Moorgate, E.C.2.

Quain Sunlight Lamps, Ltd.—Winding up voluntarily. Liquidator, Mr. G. Sinnott, 110, Cannon Street, E.C.4, appointed July 15th.

Newbridge-on-Wye Electricity, Ltd.—Winding up voluntarily. Liquidators, Messrs. H. Ashton, The Channings, Llandrindod Wells, and Mr. D. Davies, Cartref, Newbridge-on-Wye, appointed July 14th. Particulars of claims to be sent to the liquidators by August 9th.

Branson, Kent & Co., Ltd.—Winding up voluntarily. Liquidator, Mr. T. V. B. Wilmshurst, 110, Cannon Street, London, E.C.4.

Adams & Co., Ltd.—Particulars of claims to the liquidator, Mr. C. M. Skinner, 7, Norfolk Street, Manchester, by August 30th.

Hough Bros., Ltd.—Particulars of claims to the liquidator, Mr. W. L. Dominy, Friary Chambers, Friar Lane, Nottingham, by August 13th.

Collins & Lefson, Ltd.—A general meeting is called for August 27th at the offices of Herbert Peffer & Rudland, 199, Piccadilly, W.1, to hear an account of the winding up by the liquidator, Mr. R. S. Yates.

Private Arrangements.

W. T. Hales, 15, Commercial Street, Pontypool, electrical and wireless engineer.—At a recent meeting of creditors a statement of affairs was submitted disclosing liabilities of £1,280 and a deficiency of £718. The debtor commenced business on his own account in 1922. In January last he received a county court summons and from that time he had been continually pressed. The debtor stated that he had a good business connection, but he lacked capital for its proper development. He also attributed his position to bad debts. No offer was made, and it was resolved that the execution creditors should be asked for a definite decision as to whether they were agreeable to the assets being realised under a deed of assignment or in bankruptcy, and that failing a satisfactory reply the debtor should be requested to file his petition in bankruptcy. If the execution creditors agreed, a deed of assignment would be executed by the debtor in favour of Mr. S. E. Clutterbuck and Mr F. E. Bendall as joint trustees with a committee of inspection consisting of representatives of three of the creditors. The following are the principal creditors :—

	£		£
Burndept Wireless, Ltd.	70	General Electric Co., Ltd.	96
Edison Swan Electric Co., Ltd.	76	Lighting Trades, Ltd. ...	62
		Marconiphone Co., Ltd.	94

W. P. Young, trading as the Midland Electrical Co., 90, Highcross Street, Leicester, electrical factor.—A meeting of creditors was held at Leicester recently, when it was reported that the liabilities amounted to £3,930, and the net assets to £1,539, leaving a deficiency of £2,391. A note appended to the statement of affairs stated that the assets were taken on the basis of a going concern and were subject to realisation costs. It was resolved that the estate should be realised under a deed of assignment in favour of Mr. Bendall and Mr. A. S. Todd, with a committee of inspection. The following are the principal creditors :—

	£		£
Cryselco, Ltd.	121	General Electric Co., Ltd.	297
Ever-Ready Co. (Great Britain), Ltd.	56	L. G. Hawkins & Co., Ltd.	65
Edison Swan Electric Co.	171	Mullard Wireless Service Co., Ltd.	265
Foster Engineering Co.	90	Pope's Electric Lamp Co.	59
General Cable Manfg. Co., Ltd.	143	Magna Wire & Cable Co.	71

Meetings of Creditors.

Wireless Pictures (1928), Ltd.—A meeting of creditors was to be held yesterday, July 31st, at the Connaught Rooms, Great Queen Street, W.C.2.

Joseph Evans & Sons, Ltd.—A meeting of creditors was to be held at the Law Society's Hall, Sheffield, on July 30th.

Messrs. John Adams, Ltd., electrical contractors, Tariff Street, Manchester, ask us to state that they have no connection with Adams & Co., Ltd., mentioned under the above heading in our issue of July 18th.

Reduction of Capital.

G. Stibbe & Co., Ltd.—A petition for the reduction of this company's capital from £500,000 to £400,000 was presented to the High Court on June 20th and is now pending.

Book Notices.

"Rubber Information." Pp. 237. London: Leonard Hill, Ltd. Price 10s. net. A publication giving the most important facts and figures relating to the rubber industry, including plantation and factory practice, rubber chemistry and engineering, trade statistics, machinery and equipment, rubber chemicals and materials, planters and manufacturers, rubber goods of all kinds, trade marks and registered names.

"The Year Book of the British Chamber of Commerce for Italy, 1929" (224 pp.). Milan: The Chamber.—In this the activities of the Chamber since its foundation in Genoa in 1904 are reviewed; in that period its membership has grown from 140 to over 1,200 and there are sectional offices in Milan, Leghorn, Naples and Trieste. Various Italian industries are dealt with in the Year Book and some statistics of Anglo-Italian trade appear. At the end of the volume there are a classified trade index and lists of members.

"Some Notes on the Natural Features of Southend-on-Sea and District," by T. M. F. Tamblyn-Watts, A.M.I.E.E. Price 6d. Published by the author.

"Definitions and Formulæ for Students—Light and Sound," by P. K. Bowes, M.A., B.Sc. London: Sir Isaac Pitman and Sons, Ltd. Price 6d. net.

"Forty Years of Electrical Progress: The Story of the G.E.C.," by A. Gowans Whyte. Pp. 166. London: Ernest Benn, Ltd. Price 5s. net.

Recent Contracts.

Orders have been received by the Hart Accumulator Co., Ltd., for six 25-cell batteries, having capacities of 1,175, 1,273, and 1,958 amp.-hours, to be installed, in groups of two batteries each, in the Newcastle West, Newcastle East and Gosforth telephone exchanges respectively.

For Sale.

The Surrey Engineering Co., Ltd., has for sale a large stock of new and second-hand electric motors, dynamos and oil engines.

Dartford Urban District Council invites tenders for the purchase of accumulators and stands.

Whitstable Electric Co., Ltd., has for disposal a 150-h.p. Ruston and Hornsby oil engine.

Brierfield Urban District Council offers for sale d.c. motors, meters, &c.

(See our advertisement pages to-day.)

Sports and Social Events.

The first sports meeting of the employés of the Automatic Telephone Manufacturing Co., Ltd., was held on July 12th at Manor House Farm, Sefton, near Liverpool. There was a large attendance and the weather was ideal. The programme comprised over twenty events; a series of humorous contests conduced to the gaiety of the meeting, and musical selections were rendered by a section of the Wavertree Band. There was no formal presentation of prizes but the general distribution to the various winners was effected by Mr. T. A. Eades, assistant manager.

At Shenfield on July 22nd the bowls section of the Chelmsford Sports Club of Crompton Parkinson, Ltd., defeated Barking Town by 44—40, and won the double rink county championship of Essex. The Club has every reason to congratulate itself upon its performance.

New Catalogues and Lists.

Sir W. G. Armstrong, Whitworth & Co. (Engineers), Ltd., 66, Victoria Street, S.W.1.—A brochure dealing with the economics of Diesel-electric traction illustrated by examples of units in actual operation.

Messrs. Ward & Goldstone, Ltd., Frederick Road, Pendleton, Manchester.—An illustrated and priced pamphlet dealing with the company's "Indispenso" battery charger for operation on a car dynamo.

Messrs. James Gordon & Co., Ltd., Windsor House, Kingsway, W.C.2.—"Hagan Bulletin No. 51" dealing in considerable detail with the "Hagan" automatic system of combustion control and gas regulation. The brochure is well illustrated.

Electric Art Shades (1928), Ltd., Kelvedon, Essex.—A price list, illustrated in colour, of "Electa" Royal Stanley Jacobean ware table lamps and a price list of hand-painted parchment shades.

The Electric Resistance Furnace Co., Ltd., 17, Victoria Street, S.W.1.—An illustrated publication dealing with the use of electric furnaces for case-hardening special steels by nitrogen, with a separate price list.

The Standard Battery Co., 184-188, Shaftesbury Avenue, W.C.2.—Illustrated price lists of radio receiving sets and accessories, including batteries, loud-speakers, &c.

International Standard Electric Corporation, Connaught House, Aldwych, W.C.2.—An illustrated booklet entitled "Telephone Systems for Rural Districts" describing several types of semi-automatic and full-automatic telephone systems designed specially to meet the requirements of rural areas. Also "A Protective Telephone System for use on High-Voltage Lines," which gives details of a system for providing telephone communication over conductors carried on transmission-line supports.

L. G. Hawkins & Co., Ltd., 30-35, Drury Lane, W.C.2.—An illustrated brochure dealing with modern electrical kitchen equipment.

Crompton Parkinson, Ltd., Guiseley, Leeds.—A publication describing the wide range of "Crompton" ceiling fans.

Edison Swan Electric Co., Ltd., 123, Queen Victoria Street, E.C.4.—A miscellaneous collection of catalogues, leaflets, &c., dealing with stationary type batteries, weatherproof lanterns, and street-lighting equipment, enclosing lamp fittings,

rectangular flood lanterns, cornice lighting strips, meters, moulded condensers, protective and indicating devices, B.T.H. refrigerators, and Met-Vick fans and automatic kettles.

Alfred Schonemann, Leipzig.—Leaflets dealing with coil-winding machines and special machinery for all branches of electrical engineering.

The Feed Water Specialists Co., St. Paul's Square, Liverpool.—Technical Publication No. 24 treating of defects in boiler mountings.

Messrs. Hague & McKenzie, Ltd., Sloane Street, Parade, Birmingham.—A priced and illustrated catalogue of "Pyramid" aluminium ware designed particularly for use on electric boiling plates.

British Insulated Cables, Ltd., Prescot, Lancs.—Publication P.F. 70, a list of old and revised overall diameters of single cables of various types.

Brook Motors, Ltd., Empress Works, Huddersfield.—A folder stressing the high power-factor of Brook motors, and the "Brook Bulletin" for July.

Messrs. F. Parks, Ltd., 59, Newman Street, W.1.—A folder containing some excellent pictures and details of artistic lamp shades supplied by the company.

Drayton Regulator & Instrument Co., Ltd., West Drayton, Middlesex.—Lists 140 and 147, describing pressure-operated and thermostatic electric switches.

Trade Announcements.

Following upon the announcement by the Credenda Conduits Co., Ltd., in our last issue, Messrs. Baxter & Caunter, Ltd., state that they have relinquished their agency agreement with the Credenda Co., which took effect yesterday, July 31st, and have also disposed of the lease of 219, Tottenham Court Road to the Credenda Company. On and after to-day (Friday) Baxter & Caunter's business will be carried on from their new address, 221, Tottenham Court Road, W.1 (showroom and offices), and 3 and 6, Alfred Place, W.C.1 (trade counter and stores). Their telephone number remains the same as before, *viz.*, Museum 9301.

The Hammersmith branch of Superlamp, Ltd., has been removed to 223, Hammersmith Road, W.6. (Telephone: Riverside 2254.)

Messrs. Fry's (London), Ltd., state that they are closing down this year, as usual, for a few days at the beginning of August for stocktaking, &c., but the re-opening will be delayed somewhat as they are completely re-designing their hack-saw blade hardening shop, and are installing new furnaces on a conveyor system, which will more than double their present output.

The Surrey Engineering Co., Ltd., has taken premises at 36, Kirby Street, Hatton Garden, E.C.1, equipped with plant for effecting electrical repairs, the re-winding of motors, &c. (Telephone: Holborn 2334-5.)

The works and offices of the Jackson Electric Stove Co., Ltd., will be closed on Tuesday next, August 5th.

Annual Holidays.

Messrs. Brook Motors, Ltd., state that their Huddersfield works and offices will be closed from Friday evening, August 8th, until Monday, August 18th. A small staff will be in attendance to deal with urgent correspondence and spare parts. All Messrs. Brook's branches will be closed during the first week of August.

New American Appliance Marketing Company.

Mr. B. J. Grigsby, the chairman of the Grisby Grunow Company and the Majestic Household Utilities Corporation, has announced the formation of the Majestic Electric Co., Ltd., in London. This company will act as distributing agent for the products of the two parent concerns in Great Britain and the Continent.—*Reuter* (Chicago).

New Zealand Government's Expenditure.

In the course of his recent Budget speech, Mr. G. W. Fordes, the Prime Minister of New Zealand, said that during the past fiscal year £582,000 had been spent by the Government on hydro-electric supply and £657,000 on telegraphs and telephones. Of the £5½ million loan raised in London in May last £500,000 had been allocated to the development of hydro-electric works.

New Municipal Showrooms and Offices.

The Woolwich Borough Council Electricity Committee is providing electricity showrooms and municipal offices in Eltham High Street.

Prices of Materials.

Messrs. Edward Till & Co. report, July 29th: India-rubber, Para fine, 6¾d., ¼d. dec.

Messrs. James & Shakespeare report, July 29th: No change in the prices of copper bars (best selected), sheet and rod, and English pig lead.

Messrs. James Forster & Co., in their letter dated July 26th, state that the demand for lead remains quiet, but arrivals at the moment are not in excess of requirements so that present prices are maintained without much difficulty. The price is apparently affecting output in Australia, as shipments thence last month were only 6,140 tons, but the Mount Isa production will more than make up for this deficiency later on. Indications point to present prices being maintained for a time, but to a lower level in the not-far-distant future.

Lighting and Power Notes.

Aylesbury.—Loans.—The Town Council has received sanction to loans of £11,726 for mains, £837 for transformers and switchgear, and £13,000 for offices, showrooms and stores. A loan of £861 to cover the cost of the change-over in certain sections of the borough has also been applied for.

Brighton.—Power Station Extensions.—The Corporation Electricity Committee has decided to install a second 15,625-kW set at Southwick power station at an estimated cost of between £75,000 and £80,000.

Mains Extensions.—Mains extensions are to be carried out in the North Rottingdean and Ovingdean districts, at a cost of £20,000; and at Telscombe Cliff and district, at a cost of £6,000.

Bristol.—Augmented Supply to Docks.—The Corporation Docks Committee is to lay a new cable at a cost of £4,500 in connection with the increased supply to the Avonmouth docks.

Canada.—Water-power Development in Saskatchewan.—The Saskatchewan Power Commission is making an extensive inquiry into the question of the development of water power on the Saskatchewan river, which traverses the province from its westward to its eastward boundary. The principal aim of the scheme is to furnish electricity to as large a number as possible of the farmers of this great agricultural province. The first large hydro-electric station in Saskatchewan came into operation recently with the completion of the Island Falls plant on the Churchill river. This plant, however, is situated in the northern part of the province and its purpose is to furnish power for the development of the mining industry in northern Manitoba and Saskatchewan. The Saskatchewan Power Commission, on the other hand, is operating in the southern or agricultural territory of Saskatchewan and the present project is to utilise water power to supply the electrical needs of the majority of the people of the province. Up to the present the electrical power distributed by the Provincial Power Commission has been entirely steam-generated. In connection with this proposed power development, the Commission has under consideration a proposal advanced by Eastern Canadian and United States interests for the construction of a power plant costing $4,500,000 at the Horseshoe Bend of the Saskatchewan river, 35 miles east of Prince Albert.—*Reuter's Trade Service* (Regina).

Large Transformer Station for Toronto.—The Ontario Hydro-Electric Power Commission is to erect at Toronto a new 220,000-V transformer station costing about $6,000,000. The plant is to be similar to the one at Leaside which receives power at 220,000 V from the Paugan Falls plant of the Gatineau Power Company in Quebec. The new plant will be necessary in connection with the distribution of power received from the new Chats Falls development on the Ottawa River, and the Beauharnois development on the St. Lawrence, these two being among the largest hydro-electric power projects at present under construction in Canada.

Cardiff.—Year's Working.—We have received from Mr. C. G. Morley New, city electrical engineer, a copy of his report together with a statement of accounts of the electricity undertaking for the year ended March 31st last. The total revenue increased from £261,812 to £273,240 and the working expenses from £119,934 to £150,876. The gross profit amounted to £122,364 (£141,878), to which was added £9,132 from the loans fund suspense account, making a total of £131,496 available. Loan charges absorbed £93,737 and income tax £12,952, leaving a net surplus of £22,807, as compared with £46,502 in 1928-29. The capital expenditure during the year amounted to £77,197, the principal item being £64,619 for mains. The total now spent on the undertaking is £1,511,992. The sales of electricity for all purposes increased from 40,117,108 to 43,638,962 kWh, and the maximum load from 17,301 to 19,278 kW. The average price obtained per kWh fell from 1.56d. to 1.50d. Increased activity at the Docks was reflected in an increase in the energy sold for power purposes from 15,412,561 to 17,789,466 kWh. The closing down of the tramways on the Cathays route resulted in reduced sales for traction; the effect will, however, be felt more severely during the current year. The popularity of the "all-in" domestic tariff continues, the sales under that heading increasing from 863,429 to 1,352,220 kWh. New consumers connected amounted to 5,340, bringing the total to 30,891; 4,266 of these new consumers took advantage of the assisted wiring schemes. The number of cookers connected during the year totalled 244, as compared with 184 in the previous year.

Coventry.—Supply to Stivechall.—The Corporation is applying for sanction to a loan of £7,685 in connection with the provision of a supply to Stivechall.

Reduction in Bulk Supply-charges.—The Corporation Electricity Committee recommends a reduction of 7½ per cent. in charges for electricity supplied on the h.p. or bulk-supply system.

Dundee.—Special Order Amendments.—Application has been made to the Electricity Commissioners by the Corporation to amend the draft of a Special Order by inserting pro-

visions to enable the Corporation to supply and distribute electrical energy in a number of additional areas.

Ealing.—MAINS EXTENSIONS.—Sanction has been received to the borrowing of £25,000 for the laying of l.p. mains and service lines. The Electricity Supply Committee has been authorised to accept tenders for the 33,000-V trunk main and necessary switchgear.

East Ham.—YEAR'S WORKING.—The annual report on the working of the Corporation Electricity Department (engineer and manager: Mr. W. R. Elliott) for the twelve months ended March 31st last records an increase in the total revenue from £111,159 to £125,717. Working expenses totalled £79,812, as compared with £71,420 in the preceding year, while the gross profit rose from £39,739 to £45,905. After adding to the gross profit the balance from the previous account (£8,524), unemployment grant (£16) and legal expenses in connection with the High Street North explosion, there was a total of £57,561 from which the following charges had to be met:—Loan interest, £7,608; contribution to sinking fund, £8,527; income tax, £5,059; revenue contributions to capital expenditure, £16,192; transfer to general fund, £1,883; transfer to depreciation and renewals fund, £641; hire and hire-purchase installation schemes, £6,000. There remained a net surplus of £11,651, as against £8,524 in the preceding year. The capital expended during the year amounted to £60,772, the principal items being £36,696 for cables and £17,283 for machinery. The total now spent on the undertaking stands at £409,521. Sales of electrical energy increased from 11,498,340 to 13,498,658 kWh, and the maximum supply demanded from 5,635 to 6,380 kW. The average price obtained per kWh fell from 2.246d. to 2.145d., various reductions being made from the September meter readings.

Fleetwood.—LOAN SANCTIONED.—The Urban District Council has received sanction to the borrowing of £15,292 for mains and sub-stations.

Ilford.—WIRING INSTALLATIONS.—The Corporation Electricity Committee has voted £5,000 for wiring installations.

Japan.—NEW POWER STATIONS.—The Yanaguchi Prefectural Office has recently applied for powers to erect a 40,000-kW steam generating station for the purpose of supplying electrical energy to a large chemical works. Construction work is to start as soon as the official sanction is obtained.

Sanction has been received by the Godo Denki K.K. to the erection of a 5,000-kW steam power station at Tokushima and work is to be commenced forthwith.

The erection of a 30,000-kW steam power station is also contemplated by the Osaka Municipal Electricity Bureau.

TRANSMISSION-LINE ERECTION.—The Kobi Municipal Electricity Bureau is building a 33,000-V transmission line to link the Nikenjaya and Arima sub-stations.

Keighley.—YEAR'S WORKING.—The financial statement for the year ended March 31st last shows a net profit on the Corporation electricity undertaking of £1,600, as compared with a net loss of £628 last year. There was an increase of nearly 460,000 kWh in sales of electricity and the net increase in income amounted to over £4,000, although there was an increase of nearly £1,000 in discounts allowed to consumers.

Kettering.—YEAR'S WORKING.—We have received from Mr. W. A. Walker, electrical engineer and manager, a copy of the annual report together with the statement of accounts of the Urban District Council electricity undertaking for the year ended March 31st last. The total revenue amounted to £78,235, as compared with £70,192 in the preceding year, while working expenses totalled £40,178, as against £35,040, leaving a gross profit of £38,058 (£35,152). To the gross profit was added income from other sources making a total of £40,088 available. After providing for capital and other charges there was a net surplus of £6,794, as compared with £5,766 in 1928-29. During the year the capital expended amounted to £29,885, the principal item being £13,746 for mains and services. The total now spent on the undertaking stands at £500,428. Sales of electricity increased from 7,962,776 to 9,006,974 kWh. The maximum supply demanded amounted to 5,071 kW.

Leicester.—NEW DOMESTIC TARIFF.—The City Electricity Department has adopted the following new two-part tariff for domestic consumers:—A fixed annual charge of 15 per cent. of the rateable value on premises rated at £60 or below; for premises rated above £60, the fixed charge will be 15 per cent. of £60 and 10 per cent. of the remainder. Houses rated below £12 will be charged as £12 and those above £100 as £100. The "unit" charge is ½d. per kWh.

London.—HACKNEY.—YEAR'S WORKING.—The accounts of the Borough Council electricity undertaking (engineer: Mr. L. L. Robinson) for the year ended March 31st last, record a total revenue of £268,264, as compared with £272,586 in the preceding year. Working expenses rose from £121,404 to £130,068, leaving a gross profit of £138,195 (£151,181), to which was added income from other sources, making a total of £141,426 available for distribution. After deducting loan charges (£111,651), income tax (£12,457), and various other small amounts, there was a net surplus of £16,542, as against £42,174 in 1928-29. During the year the capital expended amounted to £77,042, the chief items being £14,010 for buildings, and £31,656 for mains and services. Electricity sold increased from 39,151,689 to 40,715,074 kWh, and the maximum load from 20,880 to 22,135 kW. New consumers connected numbered 3,385, an increase of 24 per cent. over the previous year. Progress continued to be made in the sale of fittings.

ST. MARYLEBONE.—The Borough Council Finance Committee recommends that application be made for sanction to loans of £120,000 for generating plant, £50,000 for mains and services, £10,631 for distribution plant and cable extensions, and £18,567 for public lighting improvements.

STOKE NEWINGTON.—The Borough Council has received sanction to the borrowing of £2,500 for sub-station buildings, £2,161 for mains and £1,398 for sub-station equipment.

HAMMERSMITH.—The Borough Council is to apply for sanction to the following loans:—Services, £29,814; sub-station switchgear, £2,252; transformer, £2,011; buildings, £1,487; and circulating water system (pumps and connections), £1,670. Mains extensions are to be carried out at a cost of £1,045.

INQUIRY POSTPONED.—The Electricity Commissioners have decided to postpone their inquiry into the proposed amendment of the London and Home Counties Electricity Order, 1925, which was to have taken place on July 24th, until the early part of October.

ST. PANCRAS.—The Borough Council Electricity and Public Lighting Committee recommends the extension of mains at a cost of £1,504.

STEPNEY.—The Borough Council Electricity Supply Committee recommends the approval of an estimate of £4,477 to cover estimated additional expenditure on the Limehouse generating station extensions.

RE-WIRING OF HOSPITAL.—The Central Public Health Committee of the London County Council recommends that tenders be invited for re-wiring at Hackney Hospital.

LIGHTING IMPROVEMENTS.—The London County Council Stores & Contracts Committee recommends the expenditure of £660 on the improvement of the electric lighting at the Peckham Rye depôt.

POPLAR.—The Borough Council Electricity Committee has voted £3,866 for various works and plant to complete the new generating station.

Mexico.—WATER-POWER DEVELOPMENT.—The National Irrigation Commission is preparing amended plans to utilise the controlled waters for the generation of hydro-electric power on a wide scale to benefit farmers in the north-western part of Mexico, where numerous streams are available and planting is possible all the year round. Numerous water-power sites are being investigated, and equipment has been ordered for making several existing plants completely automatic, which will not only permit of greater utilisation of water-power but also improve the service to rural districts in the northern part of the Federal District.—*Reuter's Trade Service* (Mexico City).

Northern Ireland.—NEWRY, CO. DOWN.—The Urban District Council is to apply for sanction to a loan of £2,000 for additional plant at its power station.

LURGAN, CO. ARMAGH.—The Urban District Council has received sanction to a loan of £14,000 in connection with the electricity scheme for the town. Permission has also been obtained to erect an overhead transmission line from Lisburn to Lurgan.

Plymouth.—LOANS.—The Corporation Electricity Committee has obtained sanction to loans of £18,000 for wiring installations, £2,000 for domestic apparatus for hire, and £3,118 for plant. Application is also to be made for sanction to the borrowing of £100,000 for mains and services.

Portland.—LOAN.—The Urban District Council has applied for sanction to a further loan of £10,633 for electricity purposes.

Preston.—EXTENSIONS.—Extensions of the electricity service to Lytham-St. Annes and Catforth are proposed by the Corporation Electricity Committee. The Committee is to spend £5,247 on mains and extensions.

LOANS.—Sanction has been received to a loan of £65,533 for development of the electricity undertaking and application is to be made for sanction to the borrowing of a further £10,000 for the assisted wiring scheme.

HIRE-PURCHASE OF COOKERS.—The Electricity Committee proposes to install electric cookers on the hire-purchase system, free of charge, the repayments to be spread over five years.

Rochdale.—YEAR'S WORKING.—There was an increase in the total revenue of the Corporation Electricity Department (engineer: Mr. F. H. Rudd) for the year ended March 31st last from £284,643 to £311,156. Working expenses totalled £250,782, as compared with £222,268 in the preceding year, leaving a gross profit of £60,373 (£62,375), to which was added a sum of £477 from the Unemployment Grants Committee, making a total of £60,850 available. After deducting capital and other charges there was a net surplus of £3,429, as compared with £7,002 in the preceding year. Expenditure of capital during the year totalled £79,520, mains and services accounting for £51,017. The total now spent on the undertaking stands at £880,726. The sales of electrical energy increased from 79,980,635 to 89,763,582 kWh, and the maximum supply demanded from 31,194 to 34,866 kW. The average price obtained declined from 0.838d. to 0.813d. per kWh. The number of consumers amounted to 9,699, as against 8,598 at the end of the preceding year.

Romsey.—Overhead Lines.—The Rural District Council has received a communication from the West Hampshire Electricity Co. stating that it is proposed to make immediate application to the Ministry of Transport for consent to the erection of overhead lines in the rural district.

Seaham Harbour.—Proposed Price Reductions.—The Urban District Council Electricity Committee recommends a reduction of 10 per cent. in charges.

Year's Working.—The accounts of the electricity undertaking for the year ended March 31st showed a gross profit of £4,825; £810 was carried forward and the reserve fund now stands at £2,519. The number of consumers was 1,658, against 985 in the previous year, and the electricity sold amounted to 502,232 kWh, as against 309,673 kWh.

Shipley.—Extensions.—The Urban District Council Electricity Committee is considering the provision of a supply to Wrose Hill at a cost of £1,100.

Southend-on-Sea.—Diesel Plant.—The borough electrical engineer and manager has informed the Electric Lighting Committee that he has further considered the saving which could be effected by the installation of the 3,000-kW Diesel set which has been offered to the Corporation for the sum of £28,000; he states that, on the assumption of an annual output of 3,250,000 kWh, the redemption of the loan in 15 years, and that the set could be installed for a total cost of £31,920, the comparative production costs would be as follows:—(1) Diesel alternator set: loan charges on £31,920, £3,192; generation cost at 0.35d. per kWh, £4,740; total, £7,932. (2) Bulk supply: kW charge 2,950 kW (statutory average) at £3 5s., £9,588; unit charge, at 0.23d. per kWh (with coal at 17s.), £3,115; total, £12,703. Difference in favour of Diesel plant, £4,771

South Shields.—Year's Working.—The annual report of Mr. James Edgar, borough electrical engineer, states that for the year ended March 31st last the total revenue from the electricity undertaking amounted to £110,276, as compared with £106,704 in the previous year. The total expenditure, including interest and sinking fund charges, was £101,640, as compared with £94,484 for the previous year. The surplus available for appropriation was £8,921, which, after meeting wages of permanent staff on capital work, left a balance of £7,016. The electrical energy sold increased from 11,053,150 to 12,068,230 kWh.

Special Orders.—The South Wales Electrical Power Distribution Co. is to apply for a Special Order to supply electricity in the urban district of Nantyglo and Blaina.

The Electricity Commissioners have submitted to the Minister of Transport for confirmation Special Orders made by them authorising Mr. R. Borlase Matthews to supply electricity in the urban districts of Bourne, Ruskington, Alford, Horncastle, Mablethorpe and Sutton, Skegness and Woodhill Spa, the rural districts of Bourne, Branston, Claypole, Sleaford and Uppingham, and part of the rural district of Welton; and the Electrical Distribution of Yorkshire, Ltd., for effecting certain amendments in the Cleckheaton and Liversedge Electric Lighting Orders.

Teddington. — Electricity for Street Lighting. — The Urban District Council has considered terms submitted by the London & Home Counties Joint Electricity Authority and has decided to change over the street lighting in the district from gas to electricity.

Uruguay.—Hydro-electric Development.—The July issue of the *Review of the Bank of London and South Africa* states that the question of the development of hydro-electric power from the Rio Negro has again been raised in the National Administration Council. The importation value of fuels and combustibles for the period 1925-29 has been estimated at approximately $80,000,000, which, it is stated, could be considerably reduced by the realisation of the Rio Negro project. The cost of the scheme is estimated to be about $20,000,000.

Walsall.—Mains Extensions.—The Corporation Electricity Committee is to extend mains at a cost of £2,140 to supply houses on the Maw Green estate.

York.—Year's Working.—We have received from Mr. E. J. Nichols, city electrical engineer, a copy of the electricity accounts for the year ended March 31st last. The total revenue increased from £142,573 to £155,665, while the working expenditure was £86,739, as against £78,407 in 1928-29. The gross profit amounted to £68,927 (£64,166), and, after deducting loan interest and contribution to sinking fund, there was a net surplus of £29,538, as compared with £28,928 in the previous year. The capital expenditure during the year amounted to £112,208, the chief items being £55,468 for mains, and £26,522 for domestic apparatus for hire. The total spent on the undertaking now stands at £602,926. Electrical energy sold increased from 24,543,618 to 27,746,651 kWh, and the maximum supply demanded from 9,813 to 10,960 kW. The average price obtained per kWh sold was 1.11d., as compared with 1.17d. in the preceding year.

Extensions.—The Corporation Electricity Committee has recommended to the Unemployment Grants Committee schemes for the supply of electricity to Nun Monkton, Kirk Hammerton, Green Hammerton, Whixley, Little and Great Ouseburn, Alne, Tollerton, Huby, Stillington, and Sutton-on-Forest, at an estimated cost of £22,419; and to Warthill, Gate Helmsley, Stamford Bridge, Claxton, Sand Hutton, and Flaxton, at an estimated cost of £7,434.

Tramway and Railway Notes.

Brighton.—Proposed Traffic Board.—An agreement has been prepared between the Corporations of Brighton and Hove and Messrs. Thomas Tilling, Ltd., for the establishment of a Traffic Board to control the transport of the district. It is proposed that the Board shall consist of five members, two representing the Brighton Corporation, one the Hove Corporation, and two the company. The Brighton Corporation is to hand over the trams to the Board when it is constituted and the company will hand over its 'buses. Hove Corporation, having no trams or 'buses to pool, will pay the Board £100,000 in cash. The Board is to have the power to borrow any further sum that may be sanctioned by the Minister of Transport up to an amount of £500,000.

Bury.—Derailment.—A derailment occurred at Radcliffe on the electric railway between Manchester and Bury on the evening of July 23rd. Traffic was disorganised till about eleven a.m. the following day.

Dearne Valley.—Extension of Time.—The Minister of Transport has extended the period for the construction of certain railways authorised by the Dearne District Light Railways Order till June 24th, 1931.

Derby.—Railless Cars.—A special sub-committee unanimously recommends that the tramways be replaced by railless cars at a total estimated cost of £272,000. The work of replacement will be divided into three sections, and each section will be served by a fleet of petrol 'buses until the work is completed. An unemployment grant is to be applied for.

East Ham.—Year's Working.—The accounts of the Corporation tramway undertaking (engineer and manager: Mr. W. R. Elliott) for the year ended March 31st last show a total revenue of £125,107, a working expenditure of £101,830, and a gross profit of £23,277. The corresponding figures for the preceding year were: Income, £118,824; working expenses, £96,582; gross profit, £22,242. Income from other sources was added to the gross profit making a total of £31,901 available, and, after providing for interest on loans, repayment of loans, contribution to sinking funds, amounting to £28,723, special reserve fund (£300), rental of leased lines (£2,460), and a deficiency brought forward from the previous year (£6,787), there was a net deficiency of £8,606. The capital expenditure during the year amounted to £2,726, bringing the total now spent on the undertaking to £339,219. The number of passengers carried increased from 21,804,654 to 23,565,508 and the car mileage from 2,087,746 to 2,088,789. The total revenue per car mile rose from 13.64d. to 14.17d.

London.—Doubling of Track.—The London County Council Highways Committee recommends the doubling of the tramway track in Grove Road, Stepney, at an estimated cost of £2,000.

Southport.—Tramways to be Retained.—The report of the Southport Tramways Sub-Committee, which was appointed to consider the question of substituting 'buses for trams, states that sufficient experience has not yet been gained to justify the change. The Committee recommends, however, that trams on certain routes which are not paying their way should be taken off and that the 'bus services, which already serve these routes, should be extended.

Wallasey.—Tramway Abandonment.—The Corporation Tramways Committee recommends the substitution of 'buses for trams on the service along Warren Drive, the change to take place from March next.

Telegraph and Telephone Notes.

China.—Shanghai.—A Consular reply to the protest of the Nanking Government (see Elec. Rev. July 18th, 1930, page 103) declares that the sale of the Shanghai telephones to the International Telegraph and Telephone Corporation is within the competency of the Municipal Council to approve, as the transaction was carried out under the relevant law. The grant of the franchise to the Corporation, it declares, will in no wise prejudice future discussions of the status of Shanghai.

France.—Railway Telegraphy.—The French Post, Telegraph, and Telephone Authorities recently inaugurated a new telegraph service which is available to passengers on a large number of the fast day trains on the various French railways. Telegrams written on the trains will be collected by railway employés and forwarded from the nearest station. The cost of each telegram will be paid by means of postage stamps attached to the telegram form, both forms and stamps being available on the trains. It will also be possible for passengers

on the particular group of trains to receive "urgent" telegrams which may be sent to them during the course of their journey. The new service has been established on the fast trains in each direction between Paris and the following points: Cherbourg, Brest, Bordeaux, Quimper, Toulouse, Cerbere, Irun, Portbou (Spanish frontier), Marseilles, Vichy, Geneva, Brussels, Strasbourg, Luxemburg, and Basle; also on the day trains operating between Basle and Dunkirk and between Basle and Antwerp.

International Telephony.—BELGIUM.—Telephone communication has recently been established between Belguim and Yugo-Slavia, Brazil, Chile, Uruguay, the Argentine, and Indo-China.

Irish Free State.—SHIP-SHORE TELEPHONY.—A new motor vessel recently built at Belfast for the City of Cork Steamship Co., Ltd., for service between Cork and Fishguard has been provided with a telephone installation which will enable her passengers to communicate with the Cork exchange when in port.

The Telephone Service.—NOTTINGHAM SATELLITE EXCHANGES.—Two and a half years ago Nottingham subscribers first benefited by Strowger automatic dial telephones. The exchanges at Central, Sherwood, Arkwright Street, and Basford, totalling 12,500 lines, were equipped for the British Post Office by the Automatic Telephone Manufacturing Co., Ltd., and to them have now been added four satellite exchanges by the same company, designed to operate on the 5-digit system and equipped with homing rotary line switches and discriminating selector repeaters. Their respective capacities are: Arnold 500 (ultimate 1,400); Beeston 900 (3,000); Bulwell 600 (1,400); Carlton 700 (2,100). Junctions incoming from other automatic exchanges in the area terminate on third selectors in the satellite exchanges, as do also direct junctions from the manual switchboard at Central. Thus the operators can obtain access to any subscriber by dialling three digits only. The duplicate main batteries of the Alton Company's manufacture, each comprising 25 cells, are kept charged by motor-generator sets comprising enclosed ventilated, squirrel-cage, 400-volt, 3-phase, 50-cycle motors directly coupled to d.c. generators with voltage regulation between 50 and 67 volts. Strowger dial telephones throughout the Nottingham area now number some 15,200 lines.

Radio Notes.

New Zealand.—LICENCES.—On April 30th, 1930, there were 58,987 listeners', 740 dealers', and 354 transmitting licences in force, a total of 40,081, as compared with 54,813 at March 31st, which means that only 75 per cent. of the licencees renewed their licences within the first month of the new radio year. According to *World-Radio*, during the year 1929-30 the four stations broadcast for a total of 8,795.4 hours; 143 long-distance relays were carried out, involving transmission over an aggregate of 30,500 miles of landline; over 73,000 letters were received, of which 10,000 came from children; and 1,500 solo artists, 58 vocal trios and quartets, 60 bands and orchestral combinations, and 32 miscellaneous organisations contributed to the evening programmes.

Sweden.—LICENCES.—The number of receiving licences issued increased during the second quarter of the year by 9,626 to 461,616, or 75.4 per "mille" inhabitants, Motala leading with 158.1 per "mille." The largest increases were at Stockholm and Gothenburg with 1,491 and 809 licences, respectively.—*Reuter's Trade Service* (Stockholm).

Switzerland.—LICENCES.—At the end of June, 1930, some 91,161 receiving licences were in force, compared with 87,002 at the end of March, 1930. Of the total, 20,501 were in Berne, 28,691 in Zurich, 5,232 in Basle, and 21,652 in Gemeinschaftsgebiet.

Contract Information.

When "Contracts Open" are advertised in our "Official Notice" pages, the date of the ELECTRICAL REVIEW containing the advertisement is given in parentheses below.

Contracts Open.

Australia.—MELBOURNE.—Posts and Telegraphs Department. August 5th. Telephone cable. (A.X. 9877.)* Testing instruments. (A.X. 9878.)*

September 23rd. Rectifiers and charging resistances. (A.X. 9968.)*

September 30th. Switchboard, instruments, and test plugs and sleeves. (A.X. 9937.)*

SYDNEY.—August 18th. Municipal Council. A.c. consumers' meters. Specifications, &c., from the Construction Engineer, Electricity Department (deposit £1). Tenders to W. G. Layton, town clerk.

Belgium.—BRUSSELS.—Post and Telegraph Authorities. August 6th. 250 miles of brown corded twin-conductor flex, 625 miles of compound wire, 187½ miles of covered flex, 97 miles of lead-sheathed cable. Particulars (Cahier des Charges Special No. 3493) for 6 francs.

Brighton.—August 21st. Corporation. Turbo-alternator, with condensing plant and auxiliaries. (July 25th.)

Canada.—REGINA (SASKATCHEWAN).—August 11th. City Council. Transformers and switchgear. (A.X. 9870.)*

Dundee.—August 13th. Electricity Department. L.p. cable. (See this issue.)

Egypt.—CAIRO.—Ministry of the Interior. September 9th. Diesel-driven generator. (A.X. 9873.)*

September 14th. Four electric air compressor sets. (A.X. 9886.)*

Egyptian State Railways.—October 2nd. 100-ton electrically-driven shallow-type locomotive traverser.

September 30th. Electric motors, pumps, &c., at the Dessonk waterworks. (A.X. 9935.)*

Guildford.—Housing Committee. Wiring of 44 houses on the Shepherd's Hill housing estate. Particulars from J. W. Hipwood, Tunsgate, Guildford.

Halifax.—August 18th. Improvements Committee. Electrician's work required in erection of shops and offices. (Bull Green development). Specifications (deposit £2 2s.) from A. C. Tipple, borough engineer, Crossley Street.

Hull.—September 18th. Electricity Department. Cooling tower pump and accessories. (See this issue.)

Ilford.—August 11th. Electricity Department. Dismantling and removal of plant at Suffolk Road refuse destructor. (July 18th.)

Irlam.—August 20th. Urban District Council. 33-kV underground cables, l.p. distributor cables, sub-station switchgear, and transformers. (July 25th.)

London.—ISLINGTON.—September 10th. Borough Council. Switchgear for sub-stations. (July 25th.)

September 2nd. Cleansing Committee. Battery for driving refuse-collecting vehicle. (See this issue.)

LONDON COUNTY COUNCIL.—August 11th. Wiring and fitting buildings on Loughborough Road housing estate. (July 18th.)

August 7th. Cables and fittings for the installation of road lighting at Colindale Hospital, Hendon. (July 25th.)

August 20th. Five electric lifts at Highgate Hill Infirmary. (See this issue.)

Lourenco Marques.—October 17th. Board of Ports and Railways. Automatic signalling system on the Ressano Garcia line. (A.X. 9971.)*

Milford Haven.—August 8th. Electricity Department. Goods and materials, including meters, &c. (July 18th.)

Newcastle-upon-Tyne.—September 15th. Newcastle-upon-Tyne Electric Supply Co., Ltd. Circulating water pumps and pump house equipment. Boiler house coal-handling plant. (See this issue.)

New Zealand.—WELLINGTON.—September 2nd. Post and Telegraph Department. Telephone bells. (A.X. 9871.)*

September 9th. Resistance tools. (A.X. 9867.)*

INVERCARGILL.—September 8th. City Council. Paper-insulated 3-core cable. (A.X. 9947.)*

Sevenoaks.—August 6th. Urban District Council. Wiring of 16 cottages. Specifications from John Mudd, clerk, "Inglewood," Oak Hill Road, Sevenoaks.

South Africa.—UMTATA.—September 2nd. Municipal Council. Water turbo-alternator, transformer, pipe line and transmission line, together with suspension bridge and telpher gear. (A.X. 9874.)*

CAPE TOWN.—August 27th. City Electricity Department. Electric motors and starters. (A.X. 9966.)*

Johannesburg Rand Water Board.—September 12th. Electrically-driven low-lift pump capable of delivering 15,000,000 gals. per diem, at the Zwartkopjes pumping station. (A.X. 9963.)

Switzerland.—Berne.—Swiss Federal Railways. August 17th. Two 6,000-kVA 60/16/33-kV transformers and 60-and 16-kV switchgear equipment for the Muttenz open-air transforming station; 60- and 16-kV switchboard equipment for the Neuenberg station: 6,000-kW phase-convertor set, and a 8,600-kVA 10/16-kV transformer for the Siebach open-air station; and a 4,000 kVA 60/16-kV transformer for the Granges open-air station. Particulars for 3 francs (approx. 2s. 6d.) from Abteilung für Elektrifizierung Dienst Gebaude der S.B.B., Zimomer 166, 43, Mittelstrasse, Berne.

Warrington.—August 11th. Electricity Department. Transformers. (July 25th.)

* Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.

Contracts Closed.

Bexhill.—Electricity Committee. Recommended:—
Feeder panel (£665) and one switch truck (£60).—A. Reyrolle & Co., Ltd.

Birkenhead.—Electricity Committee. Accepted:—
Pole-mounting transformers.—Metropolitan-Vickers Electrical Co., Ltd.
Switchgear for pole-mounting transformers.—Ferguson, Pailin, Ltd.
E.h.p. cable (£2,850).—Hackbridge Cable Co., Ltd.
Transformers (£1,864).—Metropolitan-Vickers Electrical Co., Ltd.
Switchgear (£796).—English Electric Co., Ltd.

Birmingham.—Education Committee. Accepted:—
Electric lighting installations at new schools.—Walker Bros., Ltd. (£689); T. Glover (£2,399); Harrison and Searle, Ltd. (£521); R. H. Newton (£388).

Cheltenham.—Electricity Committee:—
Erection of overhead cables to Bishops Cleeve and Woodmancote:—

British Insulated Cables, Ltd. (copper conductors) (Accepted)	3,211
,, ,, ,, (aluminium conductors)	3,125
Callender's Cable & Construction Co., Ltd.	3,316
W. T. Henley's Telegraph Works Co., Ltd.	3,563
Johnson & Phillips, Ltd.	3,378
Pirelli-General Cable Works, Ltd. (aluminium conductors)	3,130

Ealing.—Town Council. Accepted:—
Electrical installation at Coston School (£270).—Honor Bros. Horsenden School (£481).—Watson & May. Wood End Schools (£485).—Hewett & Co.

Hastings.—Electricity Committee. Recommended:—
Overhead lines and underground cables (£20,969).—W. T. Glover & Co., Ltd.

Hertfordshire.—Agricultural Committee. Accepted:—
Wiring for electricity farm buildings at Oaklands (£234).—Giffens, St. Albans.

Heston and Isleworth.—Urban District Council. 3,000-kVA transformer:—

Hackbridge Electric Construction Co., Ltd.... (Accepted)	£1,407
Hackbridge Electric Construction Co., Ltd. (Alternative)	1,070
Park Royal Engineering Co., Ltd.	1,160
Johnson & Phillips, Ltd.	1,145
New Switchgear Construction Co., Ltd.	1,120
British Thomson-Houston Co., Ltd.	1,110
Bruce Peebles & Co., Ltd.	1,100
Ferranti, Ltd.	1,080
A. Reyrolle & Co., Ltd.	1,075
Metropolitan-Vickers Electrical Co., Ltd.	1,075
General Electric Co., Ltd.	1,075
Crompton Parkinson, Ltd.	952*
English Electric Co., Ltd.	926
C. A. Parsons & Co., Ltd.	920
Fuller Electrical & Manufacturing Co., Ltd.	906
Brush Electrical Engineering Co., Ltd.	900
British Electric Transformer Co., Ltd.	850
Yorkshire Electric Transformer Co.	788

* We learn from Messrs. Crompton Parkinson, Ltd., that owing to a clerical error this figure appeared as £592 in the official minutes.

Ilford.—Electricity Committee. Recommended:—
300-kVA kiosk and transformer (£448).—Crompton Parkinson, Ltd.

Leeds.—Electricity Committee. Accepted:—
Cables.—W. T. Henley's Telegraph Works Co., Ltd. (£885); Hackbridge Cable Co., Ltd. (£730); Derby Cables, Ltd. (£786).

Leicester.—Tramways Committee. Accepted:—
Steel girder tram rails (£2,131).—Dorman Long & Co., Ltd.
Electricity Committee. Accepted:—
Electric passenger lift at Tramways Club (£412).—Gimson and Co. (Leicester), Ltd.

London.—Metropolitan Water Board. Accepted:—
Twelve months' supply of gasfilled lamps.—Siemens Electric Lamps & Supplies, Ltd.

Kensington.—Finance Committee. Recommended:—
Lighting improvements at Town Hall (£259).—Rawlings Bros., Ltd.

Stoke Newington.—Electricity Committee. Recommended:
Plant in connection with supply required for Underground Railway extensions at Finsbury Park (£999).—General Electric Co., Ltd.

Great Western Railway Co. Accepted:—
Four 50-ton and two 25-ton electrically-driven overhead cranes for locomotive repair shop, Wolverhampton.—Wharton Crane & Hoist Co.

St. Pancras.—Contracts and Stores Committee. Recommended:—
E.h.p. and l.p. cable (£7,056).—Hackbridge Cable Co., Ltd.

Stepney.—Electricity Supply Committee. Recommended:—
20,000 yds. of twin rubber-sheathed cable (£241).—General Cable Manufacturing Co., Ltd.
L.p. switchgear at Limehouse power station (£2,479).—Bertram Thomas.
Spare oil cooler section for turbines (£390).—Metropolitan-Vickers Electrical Co., Ltd.

London County Council.—Recommended:—
Improvements to power circuits, heating, and wiring for electric clocks at School of Building (£262).—H. J. Cash & Co., Ltd.
Renewal of electric storage battery at Ashford residential school (£240).—Pritchett & Gold and E.P.S. Co., Ltd.

Manchester.—Corporation Electricity Committee. Accepted:—
Supervisory control gear, Cumberland Street sub-station.—Metropolitan-Vickers Electrical Co., Ltd.
33,000-V switchgear, Denton (West) and Droylesden sub-stations.—Ferguson, Pailin, Ltd.
Dynamo brushes.—Johnson, Clapham & Morris, Ltd.
D.c.c. and d.s.c. wire.—London Electric Wire Co. and Smiths, Ltd.
Tinned copper and pure tin fuse wire.—E. & E. Kaye, Ltd; Hawkins Bros. & Co., Ltd.
Electricity meters.—Measurement, Ltd.; Ferranti, Ltd.; Metropolitan-Vickers Electrical Co., Ltd.; Chamberlain and Hookham, Ltd.; Edison Swan Electric Co., Ltd.
Sub-station switchgear.—Ferguson, Pailin, Ltd.
Transport Committee. Accepted:—
Electric wiring and power installation at Hyde Road car works.—A. E. Sudlow & Co.

Plymouth.—Electricity Committee. Accepted:—
Sub-station switchgear (£285).—English Electric Co., Ltd.
Boilers (£22,140).—John Thompson Water-Tube Boilers, Ltd.
Mental Hospital Committee. Accepted:—
Automatic electric plant and equipment (£1,892).—Kohler Co., Ltd.

Smethwick.—Health Committee. Recommended:—
Electric lighting at "The Firs" estate clinic (£209).—Walker & Co.
Electric heating and hot-water system at the clinic (£717).—Young, Osmond & Young, Ltd.

South Africa. — Cape Town. — Electricity Committee. Accepted:—
Fibre conduit (£1,750).—Key Engineering Co., Ltd.

Stoke-on-Trent.—Electricity Committee. Accepted:—
Overhead wiring and services at Stoke Lodge (£274), and at Swan Lane estates (£696).—Barnett & Soans.
Estates Committee. Accepted:—
Electric service lift at Stoke Town Hall (£246).—Wm. Wadsworth & Sons, Ltd.
Electric lighting at Burslem Market and shops (£192).—Staffordshire Electric Co.

Ware.—Herts. C.C. Accepted:—
Refrigerating plant for sanatorium (£200)—General Electric Co., Ltd.

Wimbledon.—Electricity Committee. Accepted:—
Circulating water pump (£467).—Messrs. Worthington-Simpson, Ltd.

The "Electrical Review" Service Department.

Inquiries must be accompanied by a stamped addressed envelope.

We shall be glad to learn the names and addresses of makers of the following devices:—

Emerson motors.

Brevette soldering irons.

Resistance wire having a melting point of approximately 1,700 deg. Centigrade (believed to be German).

We also have an inquiry for the British agents of The Electrical Speciality Co., of Stamford, Conn., U.S.A.

Will the firm who telephoned us for the supply voltage in Tokyo please communicate with us again?

Notes.

The British Association.

The British Association for the Advancement of Science has issued a preliminary time table for this year's meeting which is to be held at Bristol from September 3rd to 10th. From this it is seen that the meetings of Section A, Mathematical and Physical Sciences, are to be held in the Physics Laboratory of the University, and those of Section G, Engineering, in the Main Buildings of the University. The President of the Association, Prof. F. O. Bower, F.R.S., will deliver his address at Colston Hall on September 3rd. Sir Ernest W. Moir, Bt., will give his address as President of Section G on September 5th. "The Theories of Terrestrial Magnetism" will form the subject of the address of the President of Section A, Dr. F. E. Smith, Sec. R.S. Among the papers which will be presented in Section A are the following:—"The Gyromagnetic Effect" by Mr. W. Sucksmith; and "The Electric and Magnetic Properties of Metals" by Dr. E. Bloch. In Section G the papers include "The Present Position of the High-Speed Heavy-Oil Engine" by Messrs. S. J. Davies and E. Giffen; "High Steam Pressure Plants in America" by Mr. G. A. Orrok; and "Obscured Fundamentals in the Development of Integrated Electricity Supply" by Messrs. A. Lennox Stanton and Theodore Stevens. Dr. G. W. O. Howe will present the report of the Committee on Electrical Terms and Definitions. The President of Section F, Economics (Prof. T. E. Gregory), will deal in his address with "Rationalisation and Technological Unemployment." In Section L, Education, papers will be read on education for industry and commerce, among the contributors being Sir Francis W. Goodenough, Mr. A. Abbott, C.B.E., Mr. W. Henderson Pringle, Dr. A. W. Richardson, and Miss E. W. Samuel. In an evening discourse Prof. E. V. Appleton, F.R.S., will speak on "Wireless Echoes." The visits which have been arranged include the works of Messrs. R. A. Lister & Co., Ltd., and Messrs. Petters, Ltd., and the Portishead power station.

The Domestic Use of Electricity in Devon.

The relative merits of electricity, gas, and oil for cooking purposes was the subject of a discussion at a recent meeting of the Devon Education Committee at the Castle, Exeter. It was suggested that it was useless for people to be taught how to cook by electricity when the majority of them used other means in their homes. It was reported that two instructresses had been accepted by the Board of Education to attend courses of electricity as applied to the home. After considerable discussion it was agreed that it was a good thing for people to have a practical knowledge of electricity and electrical fittings.

Appointments Vacant.

Lady demonstrator for Nottingham Corporation Electricity Department.

(See our advertisement pages to-day.)

A New G.W.R. Transformer-transporting Truck.

What is known as the "crocodile truck" has recently been completed at the Swindon works of the Great Western Railway Company. It is capable of carrying 120 tons and will be used principally for the conveyance of electric transformers in connection with the National electrification schemes. It is composed of two 55-foot girders suspended between two six-wheel bogeys. The following are the principal dimensions of the trolley, which will pass curves of 1½ chain radius:—Length over buffers, 89 ft. 6in.; centre of main pivots 55 ft.; centres of supplementary frame pivots 15 ft.; wheel centres 5 ft.; wheel diameters 3 ft. 2 in.; height to top of girders, fully loaded, 7 ft 9 in.; depth of girder, 3 ft. 9 in.; load, 120 tons; tare weight, 75¼ tons.

South African Developments.

The fifth 20,000-kW set is, according to *The South African Engineer and Electrical Review*, ready for service in the Electricity Supply Commission's station at Witbank, which is operated by the Victoria Falls and Transvaal Power Co., Ltd. One additional 80,000-lb. B. and W. boiler has been erected, bringing the boiler-house equipment up to 16 80,000-lb. units per hour, which are the largest boilers at present in use in South Africa. The fifth generating unit is uniform with the others, comprising a Parsons two-cylinder turbine, alternator and exciter, operating at 3,000 r.p.m. It is probable that all five sets will in future be operated continuously, at a loading conditioned by temperature rise and at a high power factor. This will make the Witbank station the main base-load carrier of the system.

The Vereeniging power station has the advantages of cheap coal and a direct supply of circulating water from the Vaal River, without need for cooling ponds or towers. It is proposed to extend the station from the present installed capacity of 50,000 kW to an ultimate capacity of 136,000 kW. The first step in this expansion is shortly to become effective by the installation of the largest turbo-alternator in Africa, a unit rated at 32,500 kW, and 40,000 kVA, operating at 3,000 r.p.m. The various parts of this set have already been delivered at Vereeniging, and it is hoped to have it erected and ready for load by September. The steam end is divided into high- and low-pressure turbines, and is designed for existing steam conditions, namely, 200 lb. per sq. in. and 700 deg. F. A new boiler house is being provided to furnish extra steam, but so far the only additions to be made are two 60,000-lb. B. and W. boilers hitherto in operation at the Alice Street station of the Durban Corporation, rendered available owing to the Commission having taken over the greater part of the Durban load at its Congella station. The new boiler house is so designed, however, that it will accommodate boilers with a normal rating of 160,000 lb. per hr.

Novel Submarine-Cable Laying Method.

In connection with the extensive improvements of the New York Central Lines along the west side of New York City the problem arose of laying and protecting a large number of cable ducts under the Harlem River to connect the electrical systems along the main line north of the river with those that had been installed along the west side line south of the river. Some particulars of the scheme finally worked out are given in *The Times Trade and Engineering Supplement*. Thirty-six lines of wrought-iron pipe, 620 ft. long, were used in the crossing, this material being selected because of its corrosion-resisting qualities. The inside diameter of 28 of these pipes was 4 in., and that of the remaining eight was 3½ in. After being coupled into the desired lengths, given an effective coating of bituminous material as a protection against corrosion and electrolysis, and tested, the pipes were racked rigidly together in four tiers, and then the whole assemblage, weighing 186 tons, was picked up by four floating derricks, lashed together, and moved to the site of the crossing, where it was lowered into the river.

After the line had been lowered divers went down, released the pennant connections, and walked the trench to see that the ducts had seated themselves properly. Next the ducts were tested with a wooden mandrel of a diameter slightly smaller than the ducts to determine whether they had become kinked or whether water had leaked into them. Each of the 36 ducts was tested by drawing the mandrel through it, and all were found to be free from obstruction and watertight. After the completion of these tests the ducts were filled with a refined mineral oil to provide an inside protective coating and also to protect the cables as they were pulled through, 12,000 gallons being required for this purpose.

Baird Television.

We witnessed this week at the London Coliseum what was claimed to be the first exhibition of television in any theatre. The screen was a small one, and only the head and shoulders of the various persons were visible. A continuous flicker passed from left to right across the screen, and occasionally the images were inclined to disappear, but there is no doubt that the faces were quite recognisable and every facial expression was quite clearly visible. Mr. Sydney Moseley spoke for a few moments on television, and he was followed by Miss Irene Vanbrugh, who amused the audience with a clever little chat. Bombardier Wells followed and gave his impressions as to the probable result of the Scott-Stribling fight, and as everyone knows now, his somewhat dismal prophecy was fully justified. Through an announcer on the stage who carried a telephone it was possible to ask the people whose images were transmitted to perform certain actions, and these were carried out with practically no delay, to the considerable delight of the audience. The talking portion of the show was not very good, and much improvement could be made in this direction. The fact remains that the Baird system of television has been demonstrated to an ordinary non-technical audience, and it is now necessary to see whether the crudities of the existing apparatus are capable of real improvement.

An Electrical Summer School.

The Board of Education Electricity Summer School, which is being held at the Hampstead Training College, London, from July 31st to August 14th, 1930, is the first course arranged by the Board of Education on the domestic uses of electricity for domestic science teachers. Miss C. Haslett, Director of the E.A.W., has been appointed by the Board as organiser of the course, and the principal lecturers are Miss Margaret Partridge, B.Sc., A.M.I.E.E., on the electrical side, and Miss Anna Holm, Newcastle-upon-Tyne Electric Supply Co., on the domestic side.

Students have been specially selected by local education authorities, with the approval of the Board, to attend this Summer School, all their expenses being paid by the Board of Education. The Board is also paying the lecturers. It is hoped that this special course in electricity will be in future a feature of the Board's summer schools.

The syllabus of the course covers lectures each morning, from 9 a.m. to 1 p.m., on the domestic applications of electricity. During the afternoon there are either tutorial classes or visits to electrical works and showrooms.

The intention is that teachers will be able to go back and pass on the instruction to their students. During the course an inspector of the Board of Education is attending to lecture and discuss with the organiser and lecturers the best method of passing on electrical knowledge to the school child. Assistance has been obtained from E.D.A. and the B.E.A.M.A. in the provision of the electrical installation and the special equipment required for the course.

Electricity in Poultry Rearing.

At the Absol poultry farm, near Felstead, Essex, in an old tithe barn, half a million "day-old" chicks can be hatched every fifteen weeks on the "Buckeye" system, which is entirely electrical and employs mammoth incubators. For the first eight weeks the chicks enjoy artificial sunlight

Electrical Brooders at Absol Park Farm.

day and night, and at the end of that period they are brought for the first time into touch with natural surroundings. Instead of the usual grit floor, the chicks walk on wire trays, placed one over another about 6 ft. high, 150 chicks being accommodated on each tray. By this electrical method it is claimed that a chick at five days old equals in development a naturally bred chick eight days old. The electrical installation was carried out by Mr. E. A. Kett, of Saffron Walden. It is an engineering achievement, and the farm is the first of its kind in the country. "Henley" cables were used throughout the installation. The accompanying illustration shows some of the primary brooders.

The Institute of Metals.

The autumn meeting of the Institute of Metals will be held at Southampton on September 9th to 12th. The ninth autumn lecture will be given on the first day by Professor D. Hanson, D.Sc. (vice-president), on "The use of non-ferrous metals in the aeronautical industry." The papers to be presented include:—"The diffusion of aluminium into iron," by Messrs. N. W. Agrew and Olga I. Vher; "A note on the constitution of the cadmium-zinc alloys," by Mr. D. Stockdale, M.A.; "The effect of two years' atmospheric exposure on the breaking load of hard-drawn non-ferrous wires," by Dr. J. C. Hudson; "The open-air corrosion of copper. Part 2—The mineralogical relationships of corrosion products," by Dr. W. H. J. Vernon and Mr. L. Whitby, M.Sc.; "Silicon-copper alloys and silicon-manganese-copper alloys," by Mr. E. Voce; and "A new silicon-zinc-copper alloy," by Mr. E. Vaders.

Smoke Abatement Conference.

The annual conference of the National Smoke Abatement Society will be held at Leicester on September 26th, 27th, and 28th, and a programme of exceptional interest is expected to ensure the presence of many members and municipal delegates. Dr. Margaret Fishenden will read a paper on "Fuel Research and Smoke Abatement," and a meteorological expert will discuss in what ways the smoke-laden atmosphere affects the weather, and how the two subjects are related. A new indictment against coal smoke to be presented is "the smoke nuisance as the airman sees it." The special and difficult questions arising from smoke in the iron and steel industries has recently been examined by the Sheffield Manufacturers' Smoke Abatement Research Committee, and the report, by Messrs. F. J. Bailey and E. C. Evans, will be very fully discussed.

Coal for Pulverising.

A writer in *Power* refers to the belief that any coal can be burned successfully where pulverising plant is installed. As a result of many tests and observations of both boiler and industrial installations, he states that the preferable coal for installations designated for pulverised bituminous coal may be characterised as follows:—

Structure.—As friable and soft as can be obtained with other specifications.

Burning Characteristic.—Flashy, fast flame propagation.

Volatile Content.—From 20 to 27 per cent.

Ash.—Not over 8 per cent. fusion temperature.

Heat value.—Not less than 14,000 B.th.u. per lb.

Moisture.—Not over 3 per cent.

The coal should be clean. A coal of this character is an extremely flexible one in pulverised-coal burning. Good results can be secured over a wide range of fineness of grinding—its structure being such, however, that with pulverisers in even fair shape fineness is obtained—and it adapts itself to a wider range of flame, air and velocity adjustments than other coals. With it the best adjustment of all factors for highest operating efficiency can be made without compromise.

But this does not mean that this coal in itself will produce highest economies, generally speaking, in every pulverised-coal furnace in which it is used. The design of each detail of the entire plant has its effect on that. Indeed, problems of adjustment come up and sometimes minor changes are necessary to get the best results from a coal of this type, or even to improve performance, in an installation where another type of coal has been used.

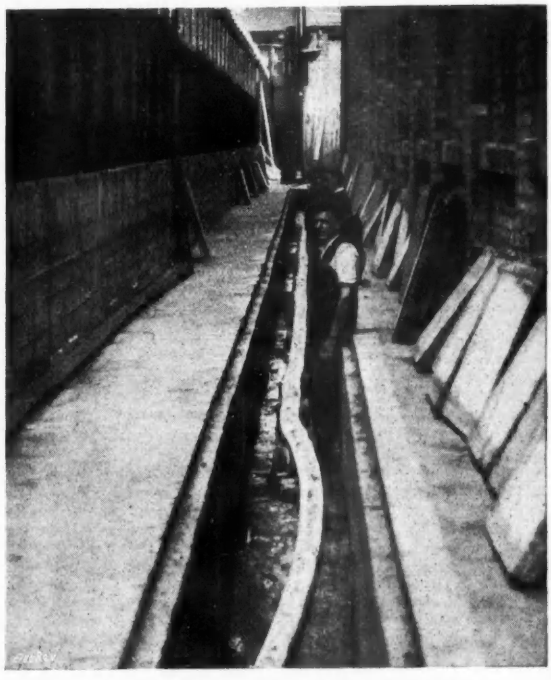
A Swedish Hydro-electric Development.

Lake Venern, the second biggest lake in Europe, covers a surface of 5,546 square kilometres, and its whole water basin, with affluents, covers a surface of 42,500 square kilometres. The Swedish Waterfalls Board for a couple of years has, according to Swedish Press reports, carried on extensive dam and canal building work, whereby the afflux can be controlled regularly, so as to economise all the water passing through the lake. At Vargoen, on the Goeta River, a plant has been built with a present capacity of 15,000 h.p., but with possibility of enlargement to 20,000 h.p. Two earlier and important water-power installations at Trollhaettan and at Lilla Edet along the Goeta River will also profit from the regulation of the immense water supplies flowing down this river.

By means of this regulation the high-water levels will be maintained at a normal average, and the water supply can be stored when needed. On Saturdays and Sundays the water will be practically held up, while it will be allowed to run more freely on working days when more light and power are required.

Trenching a Large E.H.P. Cable.

The accompanying illustration shows the laying of a three-core, 66-kV, "H.S.L."-type armoured cable at Messrs. Siemens Bros. & Co.'s works, Woolwich. The cable is accom-



5.4-in. Diameter Cable in Trench.

modated in a special trench adjoining the High-pressure Department for purposes of carrying out prolonged current-loading tests. It is believed to be probably the largest three-core cable ever handled for trench work. Its external diameter is 5.4 in., and the drum of 200 yd. weighed about 9 ton 7 cwt.; in spite of its size, however, the cable is claimed to be very flexible.

Our Personal Column.

Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements.

Mr. J. Harcourt-Williams is recommended by the Manchester Electricity Committee for appointment to the position of deputy electrical engineer, in succession to Mr. A. L. Lunn. Mr. Harcourt-Williams is at present manager of the Manchester branch of the British Thomson-Houston Co., Ltd. The recommendation was to be considered by the City Council at this week's meeting.

Mr. T. A. Blore, of Rugeley, has been appointed manager of the Retford municipal electricity undertaking. There were 95 applicants for the position.

Mr. A. H. Shaw, the borough electrical engineer of Ilford, has been granted an increase of £35 in his salary, bringing it up to £1,276.

The **Earl of Cromer** has been elected to the board of the Metropolitan Railway Company in the place of the late Mr. R. H. Selbie.

Mr. H. J. Sheppard, whose portrait appears herewith, has been appointed to the position of managing director of Messrs. Johnson & Phillips, Ltd., in succession to the late Mr. John Macgregor, as reported in our last issue. Mr. Sheppard joined Johnson & Phillips 39 years ago, and upon the formation of the limited company in 1905 became secretary. He was appointed to the board of the company in 1912.

Elliott & Fry] [*London.*

Mr. H. J. Sheppard,
Managing Director of Johnson & Phillips, Ltd.

As was recently announced in these pages, **Mr. Harry Robert Kempe,** M.Inst.C.E., M.I.Mech.E., M.I.E.E., and Mrs. Kempe, celebrated their golden wedding at their home at Lavethan, Brockham, Betchworth, Surrey. We desire to join with their other friends of many years' standing in tendering our heartiest congratulations, and expressing sincere hope that Mr. and Mrs. Kempe may have many more years of happiness in the surroundings which have always been to them so congenial. Those who have known Mr. Kempe at all intimately have been impressed by his retiring disposition and innate modesty, and the great value of his services to science have too seldom received fitting recognition because of his unobtrusiveness. He was one of the earliest editors of the Electrical Review and is still interested in this journal. In 1871 he joined the Engineering Branch of the G.P.O., and subsequently was Principal Staff Engineer and Electrician for several years until his retirement in the year 1912. Of his services during this long official career it is unnecessary to write in detail now, but he was a pioneer of electrical communication in that he designed the first submarine telephone cable laid between Dover and Calais in connection with the London-Paris telephone line. He invented and designed many telephone and telegraph devices used in the G.P.O. system, and he also introduced and largely extended the pneumatic dispatch tube system throughout the principal towns of the United Kingdom. To electrical literature he has made large contributions. His standard work "Handbook of Electrical Testing" has placed hosts of men under an obligation. It passed through many editions. "Kempe's Engineers' Year Book" has been for over thirty years, and still is, a very widely used work. We have pleasure in taking advantage of the opportunity which this present reference to his career creates to mention that the parishioners of Brockham Green, where Mr. and Mrs. Kempe have resided for over 45 years, are taking steps to recognise the many services which Mr. Kempe has rendered to the parish by establishing a permanent memorial at Christ Church for which he has a very deep affection and at which he is churchwarden and lay reader. From a circular that has reached us we gather that the memorial is to take the form of a set of oak choir stalls and fittings in the church, together with a tablet bearing a dedicatory inscription. The fund required for such a purpose is about £175, and it is thought that some of Mr. Kempe's associates and admirers in the electrical world would like to help in the raising of this small sum. We have pleasure in supporting the appeal which is made to such, and would ask them to forward donations to the Kempe Memorial Sub-Committee (Mr. G. O Theobald, chairman and honorary treasurer) at Woodlands, Brockham, Betchworth, Surrey.

Mr. J. H. Millen, superintendent of power to the Underground Railway Companies, has been appointed electrical engineer to the companies as from July 21st, owing to the additional volume of work occasioned by the programme of extension and reconstruction which is being embarked upon, and for which Mr. Arthur R. Cooper, as chief engineer, is responsible. As we have already reported, Mr. A. L. Lunn is to take up the duties of deputy electrical engineer on September 8th.

Mr. W. L. Hichens, who accepted the chairmanship of the English Electric Co., Ltd., in October, 1927, as a temporary arrangement, has resigned that office and retired from the board now that the reconstruction of the company has been completed. Sir Holberry Mensforth has been elected to the board and appointed chairman of the company.

Mr. G. H. Sammons, general distribution assistant, and **Mr. H. S. Davidson,** transmission constructional engineer, have resigned from the Wolverhampton Electricity Department. Mr. Sammons has been appointed engineering and distribution assistant to the Hampstead Electricity Department, and Mr. Davidson has secured an appointment with the Central Electricity Board (Central England Area).

Obituary.

M. Jules Richard.—The death recently occurred in Paris of M. Jules Richard, the head of the well-known French electrical instrument firm bearing his name.

Mr. C. W. Barnes,—The death occurred on July 26th, as the result of an accident, of Mr. Cuthbert Wheeldon Barnes, A.M.I.E.E., M.I.Mar.E., of Worthing.

Mr. C. C. Wharton.—We regret to record that Mr. Charles Courtney Wharton, of Birdingbury, and of the British Thomson-Houston Co., Ltd., Rugby, passed away early on Wednesday morning. He was taken ill last week whilst on holiday in Yorkshire, and an operation was found to be necessary. This was performed and for a time it appeared that all was going on well. During the week-end, however, he suffered a relapse which proved fatal.

Wills.—Mr. Dane Sinclair, the late chairman of British Insulated Cables, Ltd., the Electric Supply Co. of Victoria, Ltd., and the Midland Electric Corporation for Power Distribution, Ltd., vice-chairman of the International Automatic Telephone Co., Ltd., and a director of other companies, who died on May 6th, left £82,254 gross (£71,259 net personalty).

The late **Mr. Henry W. Dieselhorst,** formerly general manager of Messrs. Siemens Bros. & Co., Ltd., left estate valued at £8,944 (net personalty £8,826).

The late **Mr. Henry C. Watson,** of Messrs. T. B. Watson and Son, Ltd., electrical engineers and contractors, of Stockton-on-Tees, left estate valued at £22,172 gross (net personalty £4,338).

Financial Section.

New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies, Dividend Changes, Transactions in Stocks and Shares.

New Companies Registered.

Gladwell & Cook.—Private company. Registered July 19th. Capital, £500 in £1 shares. Objects: To carry on business as electricians, electrical and mechanical engineers, manufacturers, and workers of electricity, &c. The first directors are: A. C. Gladwell, 114, Orford Road, Walthamstow, E.17, electrical engineer; A. W. Cook, 77, Kenneth Road, Chadwell Heath, electrical engineer. Registered office: 12, Holywell Lane, Shoreditch, E.2.

Devonshire Radio Co., Ltd.—Private company. Registered July 21st. Capital, £100 in £1 shares. Objects: To manufacture, sell and let on hire, wholesale and retail, radio receivers, accessories, electrical instruments, &c. The permanent directors are: J. Bilantz, 72, Fountayne Road, Stoke Newington, N.16; P. E. Lewis-North, 60, South Hill Park, Hampstead, N.W., radio engineer. Secretary: J. Bilantz. Registered office: 546, Harrow Road, W.9.

British Electrotechnical Specialist Manufacturers' Association, Ltd.—Private company. Registered July 24th. Capital, £100 in 1s. shares. Objects: To adopt an agreement with H. J. Eck relating to management, to support and protect the interests of electrotechnical specialist manufacturers; to carry on the business of electrical engineers in connection with all branches of the trade; to supply technical and commercial advice on inventions, schemes, &c. The directors are: H. J. Eck, 10, Priory Road, Bedford Park, W., electrical engineer (director of Eck & Brook, Ltd.); A. M. Callow, 2, Hendale Avenue, Hendon, builder. Registered office: 10, Priory Road, Bedford Park, W.

F. F. Moore Smith, Ltd.—Private company. Registered in Dublin on July 15th. Capital, £1,000 in 600 5 per cent. participating preference and 400 ordinary shares of £1 each. Objects: To carry on business as electrical engineers, dealers in electrical supplies, carpet sweepers, cookers and other domestic appliances, wireless apparatus, &c. The directors are: F. F. M. Smith, 38, South Frederick Street, Dublin, merchant; J. R. Ramsey, 27, Grosvenor Road, Rathmines, Dublin, insurance official.

Kenneth Levell, Ltd.—Private company. Registered July 24th. Capital, £3,000 in £1 shares. Objects: To carry on business as factors, merchants, manufacturers, salesmen, importers and exporters of, and agents for, electrical, radio, television, photographic and cinematograph apparatus, &c. The subscribers are: K. Levell, Woodsome Lees, Kirkburton, near Huddersfield, electrical engineer; A. Riley, Crescent Buildings, Half Moon Street, Huddersfield, C.A. K. Levell is the first director. Registered office: Australia Buildings, 13 & 15, Market Street, Huddersfield.

Official Returns of Electrical Companies.

Central Power Engineering Co., Ltd.—T. J. McManis, 2, Foster Lane, E.C.2, ceased to act as receiver and manager on July 14th, 1930, and was reappointed in the above capacities on July 15th, 1930, under powers contained in debenture dated October 2nd, 1927.

Shoreham & District Electric Lighting & Power Co., Ltd.—Issue on July 16th, 1930, of £300 ten-year notes, part of a series already registered.

St. Austell & District Electric Lighting & Power Co., Ltd.—Particulars filed of £15,000 debentures authorised June 11th, 1930, charged on the company's property, present and future, including uncalled capital (subject to charge dated December 23rd, 1925), the whole amount being now issued.

Sherborne Electric Supply Co., Ltd.—Capital, £15,000 in £1 shares. Return dated March 27th, 1930. All shares taken up. £15,000 paid. Mortgages and charges, nil.

Electric & General Industrial Trust, Ltd.—Particulars filed of £25,000 debenture authorised July 10th, 1930, charged on the company's undertaking and property, present and future, including uncalled and unpaid capital, the amount of the present issue being £9,300.

County of Durham Electrical Power Distribution Co., Ltd.—Capital, £535,000 in £1 shares. Return dated April 2nd, 1930. All shares taken up. £535,000 paid. Mortgages and charges: £250,000.

Rissik Fraser & Co., Ltd.—Mortgage on R. & F. Works, Factory Lane, Croydon, with fixtures, &c., dated June 27th, 1930, to secure all moneys due or to become due from the company to the Midland Bank, Ltd.

Armature & Engineering Co., Ltd.—Capital, £1,000 in £1 shares. Return dated January 10th (filed May 30th), 1930. 800 shares taken up. £750 paid (being £1 per share on 600 and 15s. per share on 200 shares). Mortgages and charges, nil.

Electromobile Engineering Co. (West Bromwich), Ltd.—Capital, £2,000 in £1 shares. Return dated December 31st, 1929 (filed April 7th, 1930). 482 shares taken up. £482 paid. Mortgages and charges, nil.

British General Radio Co. (Retail), Ltd.—Capital, £200 in 1s. shares. Return dated December 31st, 1929 (filed May 21st, 1930). All shares taken up. £165 paid. £35 considered as paid. Mortgages and charges, nil.

Pembrokeshire Electrical Power & Distribution Co., Ltd.—Particulars filed of £2,000 debentures authorised July 7th, 1930, charged on the company's property, present and future, including uncalled capital, the amount of the present issue being £1,300.

A.F.M. Electrical Service, Ltd.—Issue on June 30th, 1930 of £100 debentures, part of a series already registered.

E. S. White & Co., Ltd.—B. Silcock, Bold Street, Warrington, was appointed receiver on July 15th, 1930, under powers contained in debenture dated May 29th, 1928.

General Cable Manufacturing Co., Ltd.—Satisfaction to the extent of £1,600 on July 1st, 1930 of debenture authorised June 28th, 1928 and registered July 5th, 1928. (According to the register of mortgages, the debentures registered July 5th, 1928 originally secured £41,400.)

M. P. A. Wireless (1930), Ltd.—Issue on June 27th, of £245 and on July 9th, 1930, of £405 debentures, parts of series already registered.

Ashton Electrical Co. (Preston), Ltd.—Satisfaction to the extent of £300 on July 1st, 1930, of mortgage dated September 30th, 1927, and registered October 6th, 1927.

City Notes.

Victoria Falls and Transvaal Power Co., Ltd.

The Marquis of Winchester (chairman) presided at the annual meeting on July 24th, and in moving the adoption of the report (*vide* Elec. Rev., July 18th, p. 110) said that the reserve fund now amounted to £600,000. He pointed out that the company was responsible for the operation of the plant of the Rand Mines Supply Co., Ltd.; the holding in this company was written down year by year and now stood at £1,260,137 in the balance sheet. During the year the demand for power increased by about 4 per cent. and it was still rising in spite of the fact that some of the older mines were closing. The fifth 20,000-kW set at Witbank would be on load very shortly; a set of similar size and a 32,500-kW set were being erected at Brakpan and Vereeniging, respectively, and should be put into commission during the autumn. They had been in touch with the authorities regarding the rights at the Victoria Falls but there was nothing further to report.

British Electric Transformer Co., Ltd.

The report for the past year shows that a loss of £49,674 was incurred; there was a profit of £14,740 in the preceding year. A balance of £11,095 is placed against this and the remainder of the deficit is written off against reserve. It is stated that

the issue of the report has been delayed by negotiations in connection with proposals for amalgamation or working arrangements with other manufacturers, which have, however, not yet been concluded. Reference is made to the severe competition in the transformer market, and it is said that the participation in the market of concerns with profitable allied lines during the past few years has resulted in the price of many transformers being nearly halved. Satisfactory progress is being made in the development of the company's business abroad, especially in Australia where local manufacture is now in full operation. The delivery of transformers to the Central Electricity Board was commenced in March last and will extend into 1932. Meeting: August 6th.

Dulcetto-Polyphone, Ltd.

Presiding at the annual meeting on July 25th, Mr. R. Willis (chairman) said that last year their new radio factory department was firmly established and they had laid the foundation of what should be a very solid and profitable business for the future, wholesaling as they did the products of all the principal radio manufacturers in this country. The radio manufacturing side of their business had been undertaken by their subsidiary company, Park Electric Radio Productions, Ltd. The production of this company was confined principally to the manufacture of amplifiers, radio-gramophones, &c. It had only recently started operations. The report and accounts were adopted.

W. & T. Avery, Ltd.

The annual meeting was held on July 22nd, when Sir J. Fortescue Flannery, Bt. (chairman), in presenting the report, which was reviewed in our last issue (p. 150), said that although they had not scaled the tariff walls of foreign competition they had not been defeated by them. By their intrinsic merit and by local manufacture, Avery machines were holding the leading position which they had won by their quality and fair price and by the service which the company provided. After the adoption of the report a resolution was passed increasing the capital from £1,000,000 to £1,250,000 by the creation of 250,000 £1 shares.

Croydon Cable Works, Ltd.

The accounts for the year ended December 31st, 1929, show a trading profit of £10,457, against £5,729 in 1928; a balance of £3,976 brought forward is added, making £14,433. The preference dividend is paid and £4,017 is carried forward. The whole of the plant, &c., has now been removed to the new Croydon works and the Greenwich works have been sold. Although sales increased by about 50 per cent., the net profit was slightly less owing to the costs of removal.

Imperial & International Communications, Ltd.

It was announced this week that the estimated traffic receipts for the first half of the current year were £3,108,149. This represents a decrease of £300,426 (or 9.7 per cent.) as compared with the receipts for the corresponding period of last year.

Western Union Telegraph Co.

The earnings report for the first six months of this year shows a gross revenue of $69,054,195 (against $72,803,162) and a net income of $4,326,068 (against $7,622,589).

Cable, Telephone & General Trust, Ltd.

A meeting has been called for August 6th to consider resolutions to increase the capital to £1,300,000 by the creation of 150,000 preferred ordinary and 50,000 ordinary shares of £1 each, which will rank *pari passu* with the existing shares.

A dividend of 3½ per cent. has been declared on the preferred ordinary shares.

Dublin United Tramways Co., Ltd.

The directors have declared the interim dividend on the 6 per cent. preference shares, but state that the position disclosed by the accounts for the past half-year do not justify the payment of an interim ordinary dividend.

Charing Cross Electricity Supply Co., Ltd.

An interim dividend has been declared on the ordinary shares of the West End Undertakings for the half-year ended June 30th at the rate of 9½d. per share, less tax.

London Electric Supply Corporation, Ltd.

An interim dividend at the rate of 8 per cent. per annum has been declared for the six months ended June 30th, 1930 (equivalent to 9.6d. per share).

Metropolitan Electric Supply Co., Ltd.

An interim ordinary dividend of 3 per cent. has been declared, as last year.

South Metropolitan Electric Light & Power Co., Ltd.

The interim ordinary dividend is maintained at 3 per cent.

Metropolitan Railway Co.

The interim dividend on the ordinary stock is maintained at 1½ per cent. and that on the Surplus Lands stock at 1½ per cent.

German Company.

The *Berliner Telephone Works Co.*, the majority of whose shares were recently acquired by the Standard Electricitäts A.G., has published its accounts for 1928 showing a loss of 3.49 million marks, which, with the previous year's deficit, makes 4.13 millions. It has been decided to reduce the share capital from 4.13 million to 2.97 million marks. The hope is expressed that successful working will be possible in future through obtaining larger markets within the large industrial circles of the new owners of the company's shares.

Stocks and Shares.

TUESDAY EVENING.

STOCK Exchange business in the fortnight that falls on either side of the August Bank Holiday is traditionally quiet, and there is no likelihood of any exception being made to the rule by the present year. The outstanding feature is the way in which investment money continues to flow into gilt-edged stocks. If the Consol market suffers an occasional spasm of dulness on Bank Rate or other monetary apprehension, there is plenty of support forthcoming directly afterwards, to restore prices and to evidence the conviction that investment securities command the chief attention, nowadays, amongst people (which includes companies) with funds to employ. Various captains of industry and other authorities are raising welcome voices in defiance of the depression that has settled down upon so many industries. After all, there is nothing surprising in a seasonal quietude which makes itself felt in the Stock Exchange as well as elsewhere, although it has to be acknowledged that business is abnormally slow.

New Issues.

No check has been placed upon the absorption of such gilt-edged stocks as those recently issued by the Newcastle-upon-Tyne Electric Supply Company and others. The Newcastle scrip has risen to 2¼ premium. Edmundsons' Electricity Corporation 5 per cent. debenture has advanced to 3¼ premium bid. London Electric Railway 5 per cent. debenture stock, which came out at 97½, rose to nearly 2 premium before reverting to its last week's price of 1½ premium. It is announced that underwriters of the 2½ million pounds Skoda Works 6 per cent. debentures are left with 60 per cent. of their stock. The French part of the issue, which was for a similar amount, was taken up on the first day of the lists opening. The Cable, Telephone & General Trust has called a meeting for August 6th, to consider a resolution for increasing the company's capital by the creation of a further 150,000 preferred ordinary, and 50,000 ordinary shares of £ 1 each. This will have the effect of raising the capital to £1,300,000. Pirelli 5½ per cent. debenture is better at 101½, at which price £10,000 stock is on offer.

Cables and Wireless.

No new developments of interest to the stockholders have taken place in Cables & Wireless stocks. Prices are dull and heavy. Public interest seems to be mainly confined to sales of small amounts of stock. These, in the absence of buyers, tend to exert a disproportionate effect upon the market. Imperial & International Communications, in its second traffic statement, reports a falling-off of £71,000 in the June takings as compared with last year. Globe Telegraph ordinary remain flat at 16. The preference keep around 10¾. Anglo-American Telegraphs have weakened, the 6 per cent. preferred stock dipping to a trifle below par, the ordinary stock going back to 59½. American Telephone & Telegraph shares have recovered 5½ points, advancing to 225½. International Telephone and Telegraphs are 2½ up, at 50. Fresh buying of Marconi Marines has lifted the price to 39s. 6d. Oriental Telephones at 52s. 6d. have again receded, following upon their decline of last week. Canadian Marconis are still 18s. 9d. middle.

American Comparisons.

Shareholders in Cables & Wireless may draw negative consolation from the fact that the Western Union Telegraph Company is suffering in like manner to the British Merger, from loss of traffics. The net earnings of the Western Union for the first half of 1930 are returned at $4,326,000, comparing with $7,622,500 in the corresponding period of last year. On the other hand, there is little comfort to be derived from the fact that on New Year's Eve last, American Telephone & Telegraph shares stood at 225, as they do to-day, while Cables & Wireless preference has fallen 19, the "A" ordinary 52, and the "B" stock 25 points during the seven months.

Home Railway Dividends.

The Metropolitan Railway answered general anticipation by declaring the same rate of interim dividend, namely 1¼ per cent., as that of a year ago. The strength of the price is well maintained at 67½, "Mets." in fact being one of the very few railway stocks which commands any kind of popular favour at

the present time. As mentioned here last week, hopefulness looks for an increase in the dividend for the full year, though it should be added in this connection that an improvement in the interim dividend had been anticipated by some. Underground Electric ordinary shares have eased off to 23s. 6d. Metropolitan Districts are 76 ex dividend, showing no actual change. The District and the London Electric Railways have placed, privately, £600,000 Joint Power House 4 per cent. rent charge stock at 76¼. The results announced for the half-year to June 30th last by the steam railways are disappointing in all cases, although the Southern Railway comes out fairly well on the six months. Official statements suggest that anticipated savings have been less than were hoped. The consequence is seen in a heavy fall in most of the Home Railway stocks on the week.

Home Electricity Supply.

County of London ordinary shares are 9d. lower on the week at 45s. Ex-dividend markings in St. James' & Pall Mall, and in Yorkshire Electric ordinary shares have left the prices without net alteration. Midland Electric Power shares at 31s. 3d. are easier. Egham & Staines dropped to 30s. The opening and closing price-list of a leading firm of dealers in electrical stocks and shares showed, on Monday in this week, the simple legend "No Change" in the second column (for closing prices, that is) of the 31 different issues. Scottish Power new shares are still about three-halfpence discount; County of London new shares hold their premium of 8s.

Amongst foreign stocks, a little business is being done in Tokyo Electric 6 per cent. bonds: the basis is 92 middle. Perak Hydro-Electrics are easier at 9s. 6d. In the Colonial group, Victoria Falls shares are 2 15/16 ex dividend. The chairman mentioned at the meeting that the profits last year were the largest recorded in the company's history.

Americans and Canadians.

The West Kootenay Power & Light Company is stated to be developing 162,000 h.p. now, and a new plant, the third, is projected, for raising the horse-power to nearly 200,000. Hydro-electric schemes are still popular in America, in spite of the financial depression that prevails in some Canadian and United States cities. Hydro-Electric shares are rather better on the week, at 39⅝. No changes have occurred in International Holdings at 4⅝, or in British Columbia Power "A" and "B" at 38 and 15¼, respectively. Power Corporation of Canada at 72 are 1½ higher, and Shawinigans are 1 up, at 70¼. Pennsylvania Water & Power, at 76¼, show no rally from their previous weakness. Canadian General Electric preferred are still 64. The General Electric Company of America announces a falling off in the earnings for the quarter, and also for the half-year ended June 30th, 1930. It is explained, however, that the company's 1929 figures included radio set and valve business not handled now by the company. A new company, called the Majestic Electric Company of London, has been formed, according to report, for the purpose of acting as distributing agents for products of two American undertakings. Middle West Utilities, one of the largest and most important companies in its class, reports net earnings of over 33½ million dollars for the year ended June 30th last. This is an increase of practically 40 per cent. over the earnings of the previous year.

Foreign Traction.

Further falls have taken place in the Anglo-Argentine Tramways group, the first preference receding to 2 3/16, while the 5 per cent. debenture stock has gone back 2 to 61½. The second preference remain flat at 2. Mexican Light & Power common shares are 2 points down at 69½. The Mexican Government has formulated a scheme for dealing with the arrears of interest on its bonds, and, in consequence of this, a rather more cheerful view is taken of matters in Mexico This is reflected in mild improvements in the Mexican Government bonds, but has had no effect so far upon the prices of stocks and shares in Mexican utility companies. Brazilian Tractions are ex dividend at 40; Puebla Trams are better at 31½. La Plata Tramways ordinary are quoted lower at sixpence and the preference at 13s. 6d., on the complications that have arisen in connection with the company's affairs.

Equipment and Manufacturing.

The tendency amongst shares in the equipment and manufacturing group is dull. Falls have taken place in Enfield Cables, Siemens, British Insulated, Brush, Callender's, Associated Electrical Industries, and a few others. The declines are of no particular importance, but investment seems to be passing by this market, and it takes little pressure to bring about a heavy tone. Much the same conditions prevail in other parts of the Stock Exchange. Iron and steel shares, for instance, exhibit no animation. Rubber shares are lower, on the price of the produce dropping to 5½d. per lb. Business is so quiet as a whole that it requires little buying or little selling to move prices. And the preponderance of orders is, in a number of markets, in favour of the sellers, although there are experienced Stock Exchange members who take a cautiously cheerful view of the outlook. Revival must come first, it is claimed, in the prices of metals and of commodities. After that, recovery in stocks and shares might be justifiably expected.

Share List of Electrical Companies.

Home Electricity Companies.

	Nom.	Approx. Dividend. 1928.	1929.	Price July 29 1930.	Rise or fall	Yield p.c.
	£					
Bournemouth and Poole	1	15	15	57/6	—	5 4 3
Brompton Ordinary	1	8½	8½	26/6	—	5 5 8
Charing Cross Ordinary	1	8/-	8/-	28/-	—	5 0 0
do. do. 4½% Pref.	1	4½	4½	18/-	—	5 0 0
Chelsea	1	8½	8½	26/6	—	5 5 8
City of London	1	10	10	38/9	—	4 3 1
do. do. 6% Pref.	1	6	6	23/-	—	5 4 4
Clyde Valley	1	8	8	38/3	—	4 3 9
County of London	1	7	10	45/-	—9d.	4 9 0
do. do. 6% Pref.	1	6	6	23/-	—	5 4 4
Edmundson's 7% Pref.	1	7	7	24/-	—	5 16 8
Elec. Supply Corporation	1	11	11	48/3	—	4 11 3
Kensington Ordinary	1	8	8	27/-	—	5 3 8
Lancs. Light and Power	1	7½	7	25/-	—	5 12 0
London Electric	1	8½	9	29/6	—	4 15 0
Metropolitan	1	9	10	40/-	—	5 1 3
do. 4½% Pref.	1	4½	4½	17/-	—	5 6 0
Midland Counties	1	6½	7	27/6	—	5 1 10
Mid. Elec. Power	1	15	8	31/3	—9d.	5 2 5
Newcastle-on-Tyne Ordinary	1	6	6	23/9	—	5 1 1
do. 7% Pref.	1	7	7	26/-	—	5 7 8
Notting Hill 6% Pref.	10	6	6	10⅞	—	5 11 4
North Met. Elec. 6% Pref.	1	6	6	22/6	—	5 5 9
St. James' and Pall Mall	1	8	8	27/6xd	—	5 1 10
Scottish Power	1	8	8	28/-	—	5 14 4
South London	1	8½	8½	27/6	—	5 1 10
Urban Ordinary	1	7	7	32/6	—	4 6 2
Westminster Ordinary	1	8½	8½	27/-	—	5 3 8
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	24/6	—	6 2 5
Yorkshire Elec.	1	8	8	31/3xd	—	5 2 5

Home Rails.

Central London Ord. Assented	Stock	4	4	77	—	5 4 0
Metropolitan	,,	3½	4	67½	—	5 18 6
do. District	,,	4	5	76xd	—	6 11 7
Underground Electric	£1	7	8	23/6	—6d.	6 16 2
do. do. Income	Bonds	6	6	105	—	5 14 3

Telegraphs and Telephones

Anglo-Am. Tel. Pref.	Stock	6	6	99½	—1	6 0 8
do. Def.	,,	1½	1½	24	—	6 5 0
Automatic Telephone	1	10	12½	35/-	—	7 2 10
Cables & Wireless 5½ Pref.	Stock	—	5½	77½	—	7 2 0
do. A 7½ Ord.	,,	—	—	24½	—	... ...
do. B Ord.	,,	—	—	12½	—	... ...
Globe Tel. and T. Ord.	10	10	10	16	—	*8 5 0
do. do. Pref.	10	6	6	10⅜	—	5 11 7
Great Northern Tel.	10	20	20	29	—	6 18 0
Marconi-Marine	1	12½	15	39/6	+9d.	7 12 0
Oriental Telephone Ord.	1	12	12	52/6	—$\frac{3}{16}$	*4 11 3

Home and Foreign Trams, &c.

Anglo-Arg. Trams First Pref.	5	5½	5½	2$\frac{3}{16}$	—$\frac{1}{8}$	12 11 6
do. do. 2nd Pref.	5	6	6	2	—	15 0 0
do. do. 5% Deb.	Stock	5	5	61½	—2	8 2 8
British Electric Traction Def. Ord.	,,	5	5	1525	—	... ...
do. do. Pref. Ord.	,,	8	8	123½	—	6 6 6
Brazil Traction	100	7	8	40xd	—½	5 0 0
Brit. Columbia Elec. Rly. Pce.	Stock	5	5	91½	—	5 9 8
London & Sub. Trac. 5% Pref.	1	Nil	Nil	9/-	—	... ...
London United Tram Deb.	Stock	4	4	50½	—	7 18 4
Mexico Trams, 5% Bonds	—	5	5	59	—	8 9 8
Mexican Light Common	100	Nil	Nil	69½	—2	... ...
do. 7% Pref.	100	7	7	76½	—	9 3 0
do. 1st Bonds	—	5	5	81	—	6 5 0
Victoria Falls Ord.	1	15	15	2$\frac{15}{16}$xd	—	5 2 0
Yorkshire (West Riding)		Nil	Nil	5/-	—	... ...

Manufacturing Companies.

Assoc. Elec. Ord.	1	6	6	24/6	—6d.	4 18 0
Babcock & Wilcox	1	13	15	55/-	—	*5 9 1
British Aluminium Ord.	1	10	10	39/6	—6d.	5 1 8
British Elec. Transformer Pref.	1	7	7	9/9	—	... ...
British Insulated Ord.	1	15	15	3½	—$\frac{1}{16}$	4 1 4
Brush Ord.	Stock	10	10	115½	—1	8 13 2
Callenders	1	15	15	3½	—$\frac{1}{16}$	4 5 9
do. 6½% Pref.	1	6½	6½	23/9	—	5 9 5
Crompton Parkinson Ord.	£/-	—	80	23/9	—	6 6 4
do. 8% Pref.	1	8	8	25/9	—	6 4 3
Edison-Swan 1st. Pref.	1	7½	7½	24/6	—	7 1 2
do. 6% Deb.	Stock	6	6	84½	—	5 18 4
Electric Construction	1	5½	5	12/-	—	8 6 8
Enfield Cable Ord.	1	20	20	4½	—½	4 16 10
English Electric	1	Nil	Nil	15/-	—	... ...
do. do. Pref.	1	8	Nil	11/3	—	... ...
Gen. Elec. Pref.	1	6½	6½	24/3	—	5 10 7
do. Ord.	1	10	14	50/-	—	5 12 0
Henley	1	25	30	6xd	—	5 0 0
do. 4½% Pref.	5	4½	4½	4½	—	5 6 0
India-Rubber	1	Nil	Nil	7/6	—	... ...
Johnson & Phillips	1	10	10	1⅝	—	5 6 8
Siemens Ord.	1	7½	7½	22/-	—6d.	6 16 4
Telegraph Construction	12	10	10	17½xd	—	*7 0 10

* Dividends paid free of Income Tax.

The World Power Conference.

The Second Plenary Meeting held at Berlin.

By OUR SPECIAL COMMISSIONER.

No. 6.*—*Continuation of extracts from, and comments on, selected papers of electrical interest submitted and discussed by delegates.*

Transmission Lines.

The third technical paper in this section, by Dr. A. Menge and several collaborators, describes briefly the principles of German main supply networks, and gives details of the methods adopted for the prevention of breakdowns. Protective gear for generators, transformers, and transmission-line equipment are discussed in detail and, in accordance with German practice the interconnected problems of compensation of faults and short-circuit selective protection based on time and distance are described at length. The second part of the paper deals with the economic aspects of the question and discusses at some length problems connected with remote metering, and enunciates some of the principles of contracts for the exchange of electricity.

The next five papers may be grouped under the heading of general power transmission problems, and in the words of the general reporter show that knowledge of the transmission limits of long high-voltage lines and of the stability of generating and phase-advancing stations has made considerable progress. It is recognised that the balancing of reactive load by wattless kVA generators installed at reasonably short distances is an essential condition for the transmission of large quantities of power over very long distances. The conditions for compensating reactive load are identical with the necessity of maintaining constant voltage at the points of supply. The degree to which the limits of capacity of transmission can be approached in normal operation depends mainly on breakdown conditions. Appreciable differences arise in this connection, depending on direct earthing of the neutral, or, on the other hand, the compensating of current to earth by choke coils. Improvement is expected from high-speed selective protection combined with high-speed breakers in earthed systems, in addition to very sensitive excitation control.

In power transmission over relatively short distances, especially in thickly populated areas, it is anticipated that the great reliability of cable operation will lead to the increased use of cables in transmission systems.

Line Protection.

Seven papers deal with the construction of transmission lines, which in general tend to show that in their erection the normal arrangement of lines one above the other is being discarded to an ever increasing extent and the arrangement of lines in one or two planes adopted as a safeguard against accidental contact. Pivoting cross-arms and sliding clamps are being generally favoured, as they reduce the cost of towers and foundations, whilst they do not interfere with the stability of the equipment. Efforts are being made to increase the load capacity by improved conductor design, and there is a tendency to avoid the use of twisted conductors. Improvement of fittings and the use of damping devices are looked to for obviating the dangers attendant upon oscillation of conductors.

Insulation has made considerable advances, the use of special pastes in the manufacture of porcelain insulators and scientific research into the structure of porcelain have resulted in improved materials, whilst perfected methods of manufacture and the production of larger bodies, and therefore larger one-piece insulators, have been possible.

With regard to cables, the specific stress of the dielectric has been constantly increased. Improvements in design in all types of cable have rendered the use of cables possible for very high voltages. There is apparently a tendency at present to approach the possible maximum capacity of impregnated-paper insulation, so that the development of insulating material of higher value would appear desirable. Cable laying itself is undergoing considerable changes, and the costs are being reduced by the increased use of machines.

The remaining five papers deal with auxiliary devices for increasing the reliability of operation. The main problem, particularly in large cities, is the control of short-circuit stress, and considerable advance is being made in this direction by the geometrical construction of networks and the use of choking devices.

Relay protection of generators and transformers is making steady progress, whilst in connection with rotary convertors, special steps are necessary to prevent trouble due to their falling out of step. Relay protection for this purpose has been so developed that the convertor is cut out just before it falls out of step, and devices are used which, after cutting out the rotary, automatically bring it into operation again as soon as the voltage is restored.

In connection with the protection of transmission lines, German practice has adopted a method of its own in which earth-leakage coils play a considerable part. Choke coils are coming into increasing use, not only in connection with overhead lines, but also in connection with cable systems. Devices using these coils are used for cutting out lines which have mutual electrostatic influence on the occurrence of a fault.

Short-circuit selective protection with time based on distance is claimed to have achieved considerable success in Germany, where it has been brought to a high state of perfection.

In America the so-called automatic network system has received widespread application. Disconnection of faults on the l.p. side is performed automatically by burning clear, and selective protection is used for faults on the h.p. side.

Earthing.

The second week of the Conference began with Section 21, devoted to earthing, lightning protection, and the effects of power lines on telephone and telegraph lines.

The Section produced eight papers, three of which are devoted to earthing. Of them, the first two (No. 266, presented by Mr. W. H. Blood, Junr., U.S.A., and No. 318, presented by Prof. L. T. Sirotinsky, Russia) show marked differences of opinion on earthing practice in America and Russia. Whereas in America earthing was not allowed in the early days, it later became permitted, was subsequently recommended, and now it is obligatory up to certain voltages and recommended for higher voltages. On the other hand, the 38-kV networks of the U.S.S.R., which were formerly run with the neutral earthed, are now being changed over to the insulated

* For Nos. 1 to 5 of this series see Elec. Rev. June 27th, July 4th, 11th, 18th and 25th, 1930.

neutral. It is understood that the principal reason for this change is interference with weak-current circuits.

Again, American practice favours the use of water pipes as an earthing medium, whilst in Russia connection to public water supply is prohibited, but at the same time it is recommended to earth on to special water pipes.

The discussion did not bring any further light to bear on to the reasons underlying the differences in practice, particularly with respect to the use of water pipes as an earthing medium; it is understood, however, that local conditions, particularly climatic, have some bearing on the use of public supply pipes for this purpose.

The American paper shows that there are two principal sets of regulations, the Fire Code and the Safety Code, neither of which is legally binding, but they have practically a binding effect because the insurance companies grade their premiums according to whether an installation is carried out to the rules or not.

In Russian practice a " contact " voltage is used which is calculated on a current density based on the constant short-circuit current to earth. The maximum value admissible for this " contact " voltage varies according to the density of population; thus, in uninhabited districts there is no limit and in towns it is brought down to 150 volts.

Where the earthing of apparatus is carried out, the earthing cables, the armouring of cables, steelwork of buildings, and foundations may be utilised for the purpose, but the resistance to earth must be regularly checked and recorded in a special book.

The third paper in this part of Section 21 was presented by the British National Committee; it consists of a memorandum on earthing and electrical accidents and troubles in industrial plant. The subject matter of this paper is already familiar to English electrical engineers, and from their point of view its chief interest is in the grouping of the Home Office and Mines Department instructions and the I.E.E. Regulations for the Electrical Equipment of Buildings under one head.

Lightning Protection.

The concluding part of the Section is devoted to lightning protection and inevitably contains a contribution by Mr. F. W. Peek, Junr., without which no conference on transients seems to be complete.

This paper (No. 263) on lightning and its effect on the design of transmission lines and apparatus from the economic and engineering standpoints is a continuation of the author's researches on this subject. The present paper carries us on a little further than the paper presented to the International High-tension Conference in Paris in June, 1929. As is usual with this type of paper, there is a large amount of interesting detailed information to which no abstract can do justice, this contribution is not an exception to the rule. Of special interest, one might perhaps be tempted to mention the system laid down in connection with the grading of insulators as a function of their distance from transformers or other machines.

Paper No. 423 on a similar subject by Prof. A. Matthias (Germany) runs almost on identical lines with the former paper and gives results of lightning research in Germany. The conclusion is that at the present time American lightning and German lightning have become very much alike.

The British Hour.

The day's proceedings concluded with an address delivered by Prof. A. S. Eddington, entitled " Sub-atomic Energy," and provided one of the most interesting hours of the Conference. In all justice to other addresses and authors, may it be said that this fact is perhaps partially due to a change of diet.

Prof. Eddington, in his opening remarks, pointed out that the second World Power Conference had gathered together an enormous number of delegates from all over the world, whose principal object during their technical sessions was to study the economical supply of the natural sources of energy.

Yet there was all round them an illimitable source of energy, so vast, in fact, that it existed abundantly in everything they touched. A cup full of water—or anything else that might be handy—contained enough energy to supply 100,000 kW for a year. That energy was unfortunately so securely locked away that it might as well be in the remotest star—unless they could find the key to the lock. " The cupboard is locked, but we are irresistibly drawn to peep through the keyhole like boys who know where the jam is kept."

The astonomer has discovered that it is the well recognised phenomenon of the release of sub-atomic energy which supplies the celestial furnaces with their fuel. Astronomical research, although, like many other lines of research, still in a very untidy and unsatisfactory state, has shown how the rates of radiation may be calculated for different stars.

In the same way the knowledge of the rate of radiation from the sun's surface allows calculations to be made as to the sun's age. The temperature of the sun's surface is 6,000 degrees Celsius, and the temperature at its centre is calculated to be about 40,000,000 degrees. Heat flows down this temperature gradient and reaches us in the form of warm sunshine. What supplies the energy necessary for maintaining the temperature at the centre at about 40 million degrees. After exhausting all other types of energy the conclusion is reached that they would all have used themselves up in 20 million years, and nobody now believes that the sun, and consequently the earth, are as young as that would imply. There remains sub-atomic energy, that is to say, the energy of constitution of the atomic nuclei and electrons which form the material of the star. The total amount of this energy can be easily calculated, but its liberation . . . . ?

The ultimate units which constitute matter are protons and electrons, charges of negative and positive electricity. The idea is that a proton and an electron run together and cancel—a splash in space—and nothing is left except the energy set free, which spreads out as an electromagnetic wave.

The idea is rather drastic, and there is another method by which energy may be liberated without entirely destroying matter. Instead of direct cancellation, transmutation may occur, whereby some energy is liberated, but not all.

For instance, a hydrogen atom consists of one proton and one electron. A helium atom consists of four protons and four electrons. Although they are packed in a different way, the essential fact remains that the constituents of a hydrogen atom and a helium atom are precisely the same. There are two ways of obtaining energy from four atoms of hydrogen; the protons and electrons may either cancel out and disappear; or they may rearrange themselves into helium, in which 1/140 part of the mass is lost and 1/140 of the total energy is liberated. If the latter theory is accepted the sun's age is reduced from 15×10^2 years to 100,000 million years.

Can astronomy provide any clue to the conditions of the release of this energy? Incredible as it may seem, the answer is quite definite, and is that a temperature of the order of 40 million degrees is necessary to start off the liberation. Is this the key of the cupboard? If we could attain to that temperature by heating the earth's matter, could we tap this source of energy? In the Cavendish laboratory Dr. Kapitza produces momentary magnetic fields in which the concentration of energy corresponds to about 1,000,000 deg. C. and 40×10^6 deg. does not seem unattainable, but Prof. Eddington states that when the experiment is first tried " just to be on the safe side he will take care not to be too near the laboratory."

On the other hand, if we consider rays which are known to exist, and whose penetrating power is so great that they effect the most carefully shielded gold leaf electroscope, we find that the release of sub-atomic energy is going on in the diffuse clouds of interstellar matter, which has no great degree of heat, even if its temperature is not below that of liquid hydrogen as it used to be supposed.

This is the riddle of sub-atomic energy, in which there is a superabundance of clues which lead in different directions in which we have had but a glimpse of the fog-bound frontier of knowledge.

The Colchester Fêtes.

Illuminations—"Civic Week"—and Electrical Exhibits.

MANY of the varied applications of electricity were specially featured at the Empire Exhibition and Carnival held at Colchester from July 4th to 10th. The exhibition, one of the largest ever held in the Eastern Counties, was organised by the Colchester Carnival Society under the auspices of the Colchester Town Council, the Empire Marketing Board, the Department of Overseas Trade, the Ministry of Agriculture and Fisheries, and the Dominion Governments. A "Civic and Empire Week" held in connection with the exhibition was officially opened by Mr. J. H. Thomas, M.P., Secretary of State for the Dominions and chairman of the Empire Marketing Board. Exhibits from all parts of the Empire were admirably set out in a marquee covering 85,000 sq. ft.

The whole town was handsomely decorated and illuminated. Flood-lighting was carried out at the Town Hall and the statue of St. Helena, standing out conspicuously on the summit of the building, was illuminated with coloured lamps at night. Electric lighting devices and novelties were also used largely in the general illuminations of the town, which included the flood-lighting of the ancient Castle, over which a now familiar balloon was flown (fig. 2) and effectively illuminated at night.

From fig. 3 it will be seen that B.T.H. "Mazda" lamps were equally evident at the fêtes.

For use in the pageant a large number of "Gala-lite" tattoo torches (fig. 1) were specially made by **Baxter & Caunter, Ltd.** (London). Safe in use and of light weight (2.5 lb. complete with dry battery) the torch may be held at any angle and control of the light is afforded by means of a miniature rotary switch, enabling colour grouping to be instantly achieved. The wood pole (4 ft. 6 in. in overall length) head has been carefully designed to reduce light reflection on the torchbearer to the minimum. A 5-volt lamp bulb is enclosed in each head, except in the case of the more opaque colours (such as dark blue) in which two 5-V lamps are needed for satisfactory penetration. Each lamp will burn for approximately 8 hours and the battery is easily replaced by slackening two wing nuts and one screw terminal. In place of the carbon-arc searchlights hitherto provided by the local military authorities, fifteen 1,000-watt "Blaizolite" projectors were used this year in the flood-lighting scheme that was successfully introduced into the pageant. These lanterns also were supplied by Baxter & Caunter, Ltd., and were suitably spaced and adjusted round an area of approximately two acres, which they illuminated splendidly without casting objectionable shadows.

tion, it being capable of washing, rinsing, sterilising and drying 5,000 articles in an hour. A smaller machine suitable for household purposes was demonstrated at the stand. The firm also gave special demonstrations in two tents in the exhibition grounds of Baird television.

Joslins, Ltd. (Colchester and Chelmsford) had constructed a very fair representation of a four-room bungalow. All the rooms were lighted by electricity supplied by a "Petter" plant; the majority of the electric light fittings displayed were by the **General Electric Co., Ltd.**, and other items were an electric cooker, washing machine, vacuum cleaner, &c.

Fig. 2.—Modern Publicity at Colchester.

British Vacuum Cleaner & Engineering Co., Ltd. (Fulham) displayed various models of all-British construction, including two enclosed-bag type "Goblin" cleaners; also "Turbinet" cleaners, which range from the model suitable for domestic use to the larger machines used in kinemas, hotels, &c.

Electric Art Shades (1928), Ltd. (Kelvedon, Essex) displayed entirely new lines of lamp shades, candle shields, and table lamps suitable both for the home and export trade.

Mullard Wireless Service Co., Ltd., used a public-address demonstration van, equipped with a 600-watt amplifier, to provide a musical programme throughout the exhibition and

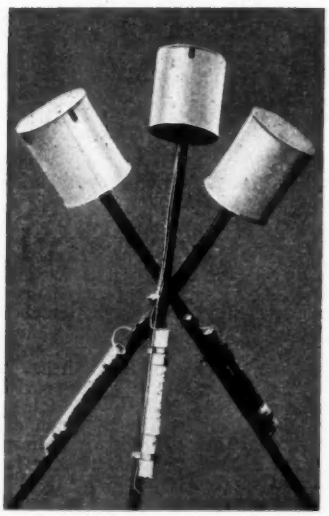


Fig. 1.—"Gala-lite" Tattoo Torches.

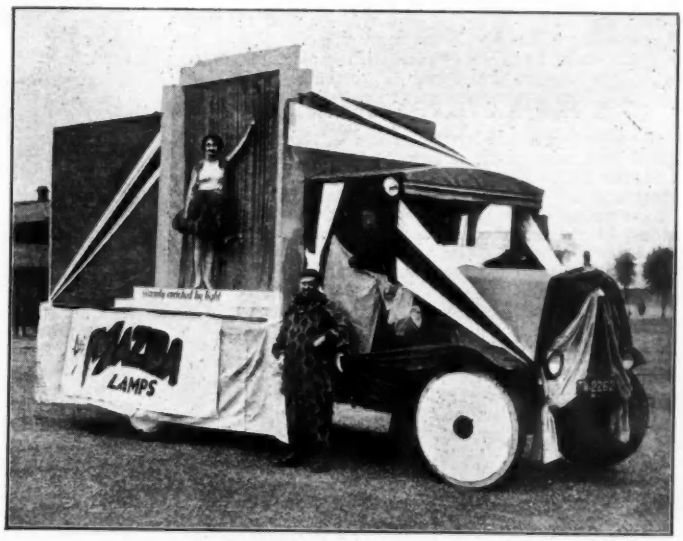


Fig. 3.—An Effectively Decorated Vehicle.

In the exhibition the Electricity Department of the **Colchester Corporation** had a stand arranged on an ambitious scale and admirably set out. Old methods of lighting were strikingly contrasted with new methods, and demonstrations in cooking, washing, and water heating were given daily. A comprehensive display of appliances was set out, and the great value of electricity in driving agricultural machinery was stressed in another section. Much interest was shown by visitors to the stand in the variety of lighting novelties.

Shrosbery & Bakewell, Ltd. (Colchester) exhibited a fine selection of electrical domestic apparatus and also supplied an electric washer to the official caterer at the exhibi-

carnival grounds. In order to help the public to understand the operation of the equipment a large-scale map of the grounds was exhibited on which the speakers and microphones were indicated by coloured lamps, and the various cables were represented by glass tubes through which coloured liquid circulated. An amusing addition was a lamp mounted at the top of the illuminated map and specially connected in such a way that its light fluctuated in accordance with the variation of speech current in the circuits.

Carron Company (Falkirk) had two stands on which it displayed a variety of its well-known products, electric cooking and heating appliances, &c.

New Electrical Devices, Fittings, and Plant.

Readers are invited to submit particulars of new or improved devices and apparatus for publication in this section.

A Moulded Switch-Fuse Unit.

We have received from Messrs. J. A. Crabtree & Co., Ltd., Lincoln Works, Walsall, England, a sample of their recent production, the "Fifty-Fifty" switch-fuse unit, fig. 1, a very neat little appliance measuring about 4¼ by 4 in. overall. It is rated at 10 A, 250 V, and is completely enclosed in a

Fig. 1.—The "Fifty-Fifty" Switch-Fuse Unit.

substantial moulded "Jacelite" case. It embodies a d.p. switch, with a quick-make and -break knife-switch action, and each pole is fused. The interior is freely accessible for wiring. The cover of the unit is locked by means of a sliding-latch arrangement, the latch itself being drilled so as to register with a corresponding drilling in the bottom projection of the case; this permits a sealing wire to be employed, so that the unit may be protected effectively from tampering or ill-use. At the top of the cover two slots engage with projections at the top of the case on the "hook-over" principle.

A New A.C.-D.C. Convertor.

A novel type of unit which enables d.c. h.t. eliminators to be supplied from a.c. mains is now being manufactured by Messrs. Climax Radio Electric, Ltd., Hampstead. It is sold under the name of "Climax" a.c.-d.c. convertor, fig. 2, and it should make an appeal to supply engineers during periods of change-over, both from the points of view of economy and satisfaction to consumers. The convertor is made in two types, one with valve rectification and the other with metal

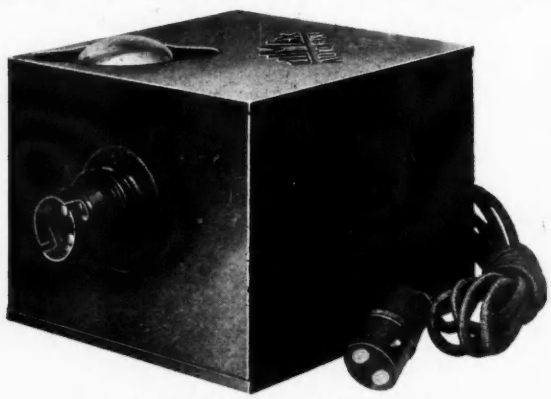


Fig. 2.—The "Climax" Convertor.

rectification. In both types adequate smoothing chokes and condensers are fitted to enable ripple-free reproduction to be obtained with any make of d.c. eliminator. The convertor is constructed to comply with the latest I.E.E. regulations. The valve type is supplied with either of two makes of full-wave rectifying valve, one for a d.c. output of 240 volts at 20 milliamperes, and the other for 240 volts at 50 milliamperes. The metal type is supplied in two models, one giving 20 milliamperes at 150 volts and using half-wave rectification, and the other, employing full-wave rectification, giving an output of 50 milliamperes at 180 volts. Either of the models can be supplied with a voltage regulator, enabling the output voltage to be varied over wide limits. On test the convertors were found to deliver their full rated output without any sign of overheating. As is usual with all forms of rectifiers, the voltage dropped as the load was increased. The use of the regulator enabled the output voltage at full load to be varied smoothly from 100 volts up to the maximum. The convertor was tried in conjunction with a d.c. eliminator made by the same firm on a three-valve set of the screened-grid and pentode type, and the results obtained were excellent, it is claimed, with complete absence of mains ripple.

A Unit-type Mining Switchboard.

The accompanying illustration, fig. 3, depicts a three-unit mining-type switchboard recently constructed by British Jeffrey Diamond, Ltd., Stennard Works, Wakefield, for a large Midland colliery. It is very compact and consists of three 60-A oil-immersed circuit breakers of the company's standard design; similar switchboards can be supplied with any number of units. Ready means are provided for moving the apparatus as the face advances by mounting the units on a common sledge plate. Despite strict adherence to minimum dimensions, it is claimed that none of the essential details of accessibility are sacrificed, and the provision of re-

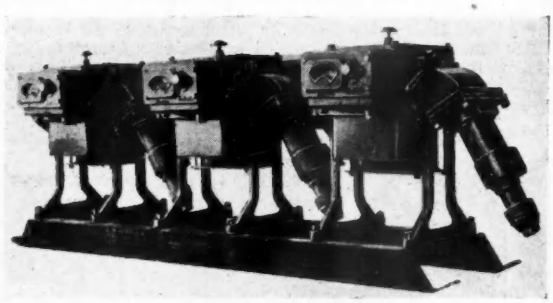


Fig. 3.—"Jeffrey-Diamond" Unit-type Mining Switchboard.

movable covers, suitably interlocked to give full protection, make inspection and adjustment readily possible. The breakers are fully interchangeable. Each unit is completely flameproof, and is provided with mechanical interlocks. The breakers are of the "free-handle" type, so that in the event of a short-circuit the switch cannot be closed. A fall of roof on to the handle results in immediate tripping of the switch. Large-section laminated brush-type main contacts are provided to allow a fairly large overload to be taken over a fair length of time without any serious effects. The provision of self-aligning auxiliary contacts between which the arc is drawn out effectually protect the main contacts from burning or pitting. A strong spring movement for the "make" and "break" arrangements is fitted to the contact arm to assist the mechanism to acquire a high initial speed and at the same time to permit the contacts to open and close cleanly. As standard, two adjustable overload trip-setting inverse-time lags are fitted, but for three-phase work a further coil is added when required. The rupturing capacity is 12½ times the normal loading. A patented auto-variable overload release which can be embodied as a further feature makes allowance for the initial rush of current on starting, and after the motor attains full running speed the mechanism is automatically set to give very close protection. As a self-contained part of the breaker, no-volt coils can also be fitted which trip the switch when the supply falls to approximately 50 per cent. of the rated line voltage. The usual pattern of interlocked British Standard plug is fitted at the outgoing end of each unit in an oblique direction, so as to aid compactness and also to direct the cable to travel along the floor.

New Asbestos-insulated Cables.

An interesting development of BRITISH INSULATED CABLES, LTD., Prescot, Lancs., is the production of a new "Rockbestos" brand of asbestos-insulated wire, for which the following claims are made. It is made by special patented processes to ensure very special results. The "Rockbestos" type of insulation, in addition to possessing the heat-resisting qualities of asbestos, is mechanically very strong, and it will withstand the bending demanded by severe industrial work. It will not deteriorate electrically or mechanically with age. The covering can be applied in a thickness no greater than that of an ordinary double-cotton covering, so that it meets the need for a heat-resisting winding wire which will not necessitate increasing the sizes of slots or bobbins. The insulation is composed of pure, long-fibred asbestos, thoroughly separated, carded and spun into a yarn or roving which is wound uniformly upon the conductor. It is saturated with a chemically neutral compound and compressed into a continuous wall of insulation of the required thickness. The heat-resisting qualities of "Rockbestos" brand wire are such that the severest overloading and the highest ambient temperatures cannot destroy it. It will not burn or carry flame, even when subjected to the heat of an electric arc. "Rockbestos" wires and cables are obtainable in sizes and types suitable for magnet winding, cooker and fire wiring, connections to heavy-duty controllers, and for many other purposes under conditions of temperature which would be fatal to other types of insulated conductors. British Insulated Cables, Ltd., have the sole manufacturing and selling rights for all parts of the world outside the continent of America.

Electricity in a West End Store.

A Modern Installation with some Unusual Features.

AN interesting electrical installation has recently been completed at the White House (Maison L. Giraud), 51, New Bond Street, W.1. An entirely new shop front has been installed with modern window lighting by means of concealed silver-glass reflectors, with cornice lighting in the entrance between the windows. The whole of the shop interior has been reconstructed and redecorated, and new lighting in modern styles installed. This business specialises in high class lingerie and household linen, and a laundry has been installed in the basement where all articles, before being offered for sale, are laundered. The space available for the installation of steam-raising plant being very limited, a solution to the problem was found by installing a 120-kW "Mascarini" electrode boiler. This boiler supplies steam at a pressure of 60 lb. per sq. in. to a drying cupboard, a rotary washing machine, and large and small calenders. It is automatic in operation, the load taken from the mains being self-regulating according to the demand made for steam upon the boiler. Steam is raised from cold in a few minutes, and the simple operations required for starting and shutting-down are carried out by the forewoman of the laundry. Over the sinks where hand-washing is done is fixed a large "Bastian" thermal-storage water heater that supplies water to these sinks. Should the demand for water be greater than this storage tank can handle, water can be heated in the sinks by blowing steam directly through the water.

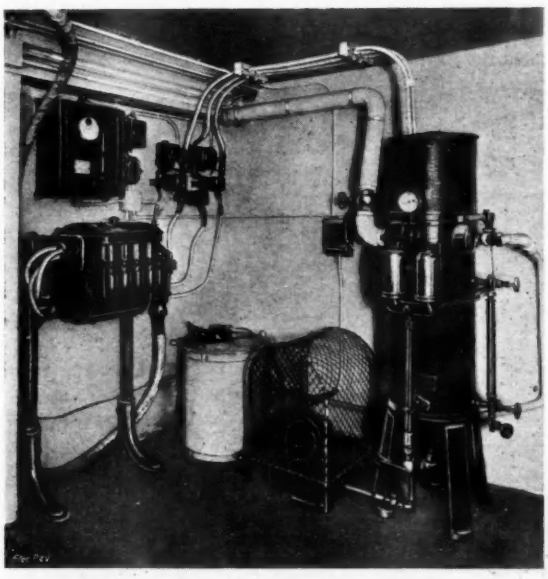


Fig. 1.—The "Mascarini" Boiler.

The whole of the hand ironing is done by cordless type electric irons made by the Dowsing Radiant Heat Co., Ltd. These are of various shapes and sizes and are used in conjunction with control panels into which the irons are placed for heating up. These panels each consist of a switch and pilot light and special contacts which, when the irons are placed on the stands, make contact with lugs on the irons and so supply current to the elements.

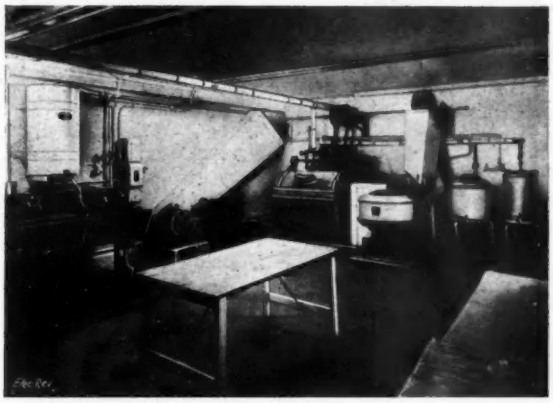


Fig. 2.—The Electrical Equipment in the Laundry.

The canteen in which meals are supplied for the staff is equipped with two 10-kW Jackson electric cookers.

It is interesting to note that 8¼ miles of conduit and 10¼ miles of cable have been used in the lighting and heating installation, while the low-temperature "Dulrae" tubular warming panels have a total length of 1½ miles of heating tube installed. This represents 183 warming panels having a total radiating surface of 2,700 sq. ft. on the ceilings. The total volume of the rooms warmed is 211,600 cu. ft. Therefore the heating load works out at approximately 0.38 watt per cubic foot overall. Sufficient warming surface has been installed to maintain a temperature rise of 30 deg. F. above the outside air, in showrooms, offices, and workrooms, which are all controlled by means of thermostats, and a rise of 10 deg. F. in storerooms, which are switch controlled. The heating tubes have a loading of 10 watts per ft. run, and are spaced 4 in. apart. Each consists of an element wire threaded through glass-lined steel tubes, and the ends of each panel terminate in an octagonal header box to which the circuit conduits may be connected. Sheets of cork are attached to the joists, and the panels are fixed on top of these. Expanded metal lathing covers the panels, and the whole is embedded in the ceiling plasterwork, a suitable plaster containing hydrated lime being used for this.

The following are the connected loads of the installations:—Lighting, 34 kW; heating, 81 kW; power, 8 h.p.; cooking, water heating and iron heaters, 52 kW; electrode boiler, 120 kW. The installation is connected to the mains of the Westminster Electric Supply Corporation, Ltd., and was carried out by Messrs. Grierson, Ltd., the "Mascarini" boiler and the thermal-storage water heater being supplied by the Bastian Meter Co., Ltd., and the laundry apparatus by Messrs. Braithwaite & Co., Ltd. The consulting engineers were Messrs. Lucas & Pyke.

A Telephone Works Visit.

Wireless wholesalers' two-days tour of the "Gecophone" factory at Coventry and brief notes on some of the new season's wireless instruments.

IN an effort to maintain direct contact with that section of the industry which distributes one of its numerous classes of products, large parties of representatives of the wireless wholesale trade were invited to tour the telephone and radio apparatus factory of the General Electric Co., Ltd., at Stoke, near Coventry, on Thursday and Friday last week. In addition to the opportunity which the visit afforded of inspecting the works themselves, during which the high standard of workmanship that is insisted upon in the make-up of all apparatus was made plainly apparent, advantage was taken of the occasion to examine in detail representative samples of new radio receivers and loud-speakers which the company will be marketing in due course, while short lectures were delivered emphasising features of their design, construction, and performance, and outlining the company's commercial programme in anticipation of the new season's radio exhibition in September.

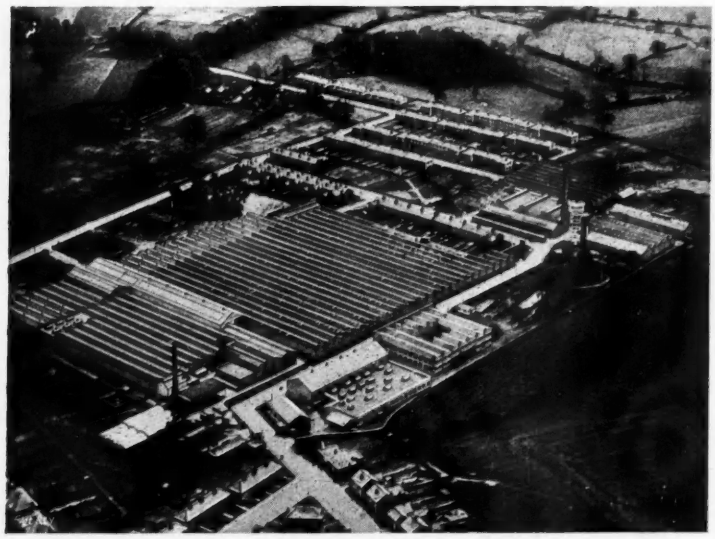


Fig. 1.—Aerial View of G.E.C. Telephone Works and Housing Estate.

The factory in which the wireless sets and their component parts are manufactured occupies part of an extensive site which also accommodates the G.E.C. telephone works (see accompanying illustrations), the productive floor space representing an area of nearly nine acres, exclusive of administrative offices, canteens, garages, residential and social clubs, recreation grounds and golf course, and housing estate. The works are built on one floor, providing airy well-lighted bays with spacious accommodation for, roughly, 5,000 workpeople.

A large covered way divides the works into two principal sections: on the north side lies the main mill, which is equipped with modern wood-working machinery, and round it are grouped the timber-drying sheds, stores, finishing shops, and stockrooms. On the south side, the main factory covers an area of something like a quarter of a million square feet and includes one of the largest machine and assembly shops of its kind it has been our privilege to inspect under one roof.

In accordance with the company's consistent policy of organising and controlling its own production so far as it is possible to do so, every part which goes to make up a radio receiving set is made of raw materials at the Coventry works themselves or one of the several other factories of the company in different parts of the country, while an investigation department, functioning in close co-operation with the main research laboratories at Wembley, is constantly engaged on practical workshop problems and process simplification.

One of the principal items demonstrated for the instruction of the visitors was the new "Osram Music Magnet Four" home constructor's kit of parts which is being introduced in substitution for the three-valve combination hitherto available, but which is now considered to be insufficiently selective for high-power regional reception. The well-made components of the new set can be assembled quite easily, no wood-working or soldering being required; the polished oak cabinet is 8.5 in. high, 11 in. deep, and 19 in. long. The circuit comprises two screen-grid high-frequency stages, a detector, and one low-frequency stage, one-dial tuning with reaction and volume control simplifying manipulation.

The two screen-grid valves are responsible for "pulling in" a large number of stations and at the same time they are also effective for obtaining the necessary selectivity. By the employment also of specially designed coils greater efficiency has been obtained over both the medium and long-wave bands, whilst a special screening device has been provided for each stage on the high-frequency side of the receiver, which still further increases its reception capabilities, but the inclusion of an extra valve stage has in no way complicated the construction of the set, and every care has been taken in its design to enable the home constructor to put it together without fault. It was found necessary to embody a volume control, which incidentally also acts as a further device for separating closely associated wave-lengths.

Considerable care has been applied this year to the production of the instruction sheet which goes with the "Music Magnet." Not only does it clearly define how the set can be made up, but at the same time it offers some very useful hints to the listener on manipulation. On the actual chart some 54 stations are marked and the majority of them can be heard in almost any part of the British Isles. In order to assist the listener a device has been evolved whereby the user, having ascertained on the indicator drum of the instrument the position of his own local station, can then quite easily find any other station shown on the list before mentioned.

Fig. 2.—Automatic Telephone Line-switch Assembly and Test Bay.

Apart from its performance, one of the greatest selling points of the new kit will be its low price. The Company's dry battery prices are also to be revised next month, a larger

capacity type having been made for operating the new receiving set, which has a current consumption of from 17 to 18 milliamperes, though it may of course be mains operated if desired. By the way, it should be noted that the Company is changing the name of its wireless accumulators from "Geeko" to "Magnet" in order to have one trade name only for both anode and filament batteries.

Some idea of the number of portable receivers turned out is afforded by fig. 5, which shows rows of them with their frame aerials and cone speakers ready to be fitted within their lids. Fig. 3 is a view of a typical automatic telephone exchange equipped by the company and the orderly spaciousness of the assembly shops is depicted in fig. 2.

An impression of the size of the works themselves is obtainable from the aerial view (fig. 1) which also shows part of the employés housing estate. The advantages and facilities available to the workers are on the usual liberal scale one has become accustomed to associate with the G.E.C. organisation. They include the benefits of sick, benevolent, and pension funds; a savings association, service bonus awards, and the many and varied social and recreational amenities of the Magnet Club with canteen premises, the capabilities of which were demonstrated by the two-days' catering for large numbers of visitors last week. Fig. 4 is a view of part of the luncheon hall and at the top table Sir William Noble, Mr. R. W. Roberts (directors), and Mr. H. P. Wells (general manager, Coventry works) will be recognised amongst other well-known personalities. The sports and residential Grange Club, which is limited to members of the staff by election, is the envy of all visitors. A striking feature of all the above-mentioned activities is that they are financed and managed entirely by the workpeople themselves in a way that instils a genuine family spirit.

Finally the extensive welfare organisation that endeavours to generally safeguard the health, comfort, and well-being of the employés is frequently the subject of unstinted praise from public health officials for the many ways in which supervision is exercised and assistance rendered daily in cases of sickness and distress which must inevitably occur in a community numbering over 5,000.

The combination of resources and facilities of which the above-outlined activities are indicative represents a degree of merit that needs no emphasis. Even small accessory details which some manufacturers might consider of only secondary importance are clearly the products of skilled craftsmen working with good-class materials, and the attention given to details is invariably a measure of the basic care exercised throughout the production stages.

Fig. 3.—Example of Automatic Telephone Installation for G.P.O.

Fig. 4.—Part of the Luncheon Room in the Magnet Club, Coventry.

Fig. 5.—Assembling Portable Radio Receiving Sets.

The Television Society.

The Television Society was registered on July 12th as a company limited by guarantee without share capital, with not more than 1,000 members, each liable for £1 in the event of winding up. The word "Limited" is omitted from the title by licence of the Board of Trade. The management is vested in a council of 20, amongst the first members of which are Mr. T. W. Bartlett, Prof. F. J. Cheshire, Sir Ambrose Fleming, Sir Philip Gibbs, Lord Angus Kennedy, Admiral Mark Kerr, and Sir John Samuel.

The O.L.A. Summer Meeting.

An account of a visit to the Aylesbury Corporation's electricity works and a tour of inspection of the municipal overhead-line system in sparsely-populated country districts.

TRAVELLING by road and rail, some 85 members of the Overhead Lines Association, with their ladies and friends, assembled on July 23rd at Aylesbury for their summer meeting. After inspecting the generating plant and grid bulk-supply transformers (33/11-kV outdoor) and switchgear, and posing for a group photograph, which is reproduced below, the party set off on a morning motor coach tour of part of the Borough's rural area of electricity supply, comprising some 250 square miles in Mid-Buckinghamshire and small areas in Oxfordshire and Hertfordshire.

Passing Hartwell House about two miles out (the residence of Louis XVIII of France when exiled in England) the village of Stone afforded an example of single-phase, three-wire, 440/220-V distribution, the neatness of the overhead-line construction made possible by the Electricity Commissioners' modified regulations being noticeable, though telephone-line guarding at places somewhat spoils the appearance of the power lines. At Eythorpe four large houses that have stood empty for some time have been re-occupied since supplies of electricity became available. Chickens are reared under electric brooders there on the poultry farm of Mr. James de Rothschild, whose residence, Waddesdon Manor, is supplied with electricity; in fact, it is made use of extensively on the whole of his estate, even his race-horses on the stud farm being given the benefit of ultra-violet-light treatment.

The O.L.A. at Aylesbury; 1930 Summer Meeting.

The return journey to Aylesbury was along the Akeman Street, the old Roman road, and prior to luncheon at the invition of the Corporation (over which Councillor Fred. Taylor, chairman of the local Electricity Committee, presided, supported by the Mayor and Mr. Theodore Stevens, M.Inst.C.E., M.I.Mech.E., M.I.E.E., president of the O.L.A.), a short business meeting was held which resulted in the election of several new members and of Mr. W. A. Turnbull, Wh.Ex., A.M.Inst.C.E., A.M.I.E.E., as vice-president of the O.L.A.

The resumption of the coach drive in the afternoon was by way of Stoke Madeville to Wendover, some two miles beyond which the beaten track was left behind; proceeding through Dunsmore village, Coombe Hill (one of the highest points in Buckinghamshire) was reached, on foot by a section of the party owing to a coach mishap, though happily unattended by any very serious consequence. Apparently without devoting much time to the wonderful views of the Vale of Aylesbury, the leading contingent must have continued unchecked past "Chequers Court," the Prime Minister's country residence, through a number of small villages on the way to Princes Risborough, it being pointed out that up to that point electricity is available to practically every residence in the area traversed.

Through Longwick and Thame, where John Hampden died after being wounded in the battle of Chalgrove Field against the Royalists, the party passed on to Long Crendon, where it is claimed that French Huguenots made the first steel needles to be manufactured in England, and reached Chilton, whose supply was switched in the week before. Although the conductors were "alive," the absence of insulators was commented upon; they are due any day and will be added on arrival.

At the goal (Rom. Ant., pillar at turning-point in chariot race) tea was awaiting the tourists after they had witnessed (through Mid-Bucks. mist) the official inauguration of the local supply. Councillor Fred. Standring, deputy chairman of the Aylesbury Electricity Committee, asked Mr. Hunt, chairman of the Brill Parish Council, to perform the switching-in ceremony, and subsequently at tea Councillor Rupert East, Mayor of Aylesbury, thanked him for officiating and presented him with an electric toaster as a small memento of the occasion.

In conformity with the rest of the system the 3-phase, 11,000-V a.c. feeders are mounted on brown porcelain pin-type insulators on single cross-arm wood poles, the third conductor being on top of the poles. The 11,000/440-V transformers are mounted on H-poles and connected to the incoming feeders through lightning coils, silver-wire fuses, and plain air-break isolating switches operated by hand rod from the ground level. The outgoing single-phase, 3-wire, 220-V distributors are fused and carried on wood "Aylesbury" poles in which three vertical holes are drilled to accommodate porcelain bushing insulators through which the conductors are threaded. Street lighting is astronomically controlled by electrically-wound time switches connected by a stranded galvanised-steel wire carried on top of the poles.

Brill is centrally situate in one of the most sparsely populated areas of England, namely, only 105 persons to the square mile. There is no industry beyond agriculture, and that does not appear to be in a too flourishing condition. Nevertheless, the village is typical of many hamlets and townlets that have been electrified successfully since the rural project was embarked upon in January, 1926. Indeed, the expedition with which the work has been proceeding threatened at one time to embarrass the undertaking, with its generating capacity totalling but 2,900 kW; however, this has now been obviated by the purchase of energy in bulk from the Central Electricity Board's national grid.*

Overhead-line construction and maintenance are carried out by the undertaking's own staff and the celerity with which

* See Elec. Rev., February 7th, 1930, p. 270.

the work done is an object lesson to all concerned with the subject. Some 86 miles of transmission lines have already been constructed, the length of high- and low-voltage lines in use being 157 and some 36 miles more are contemplated. A large proportion of the high-voltage conductors consists of high-tensile steel wire, stranded and galvanised, the use of which material reduces the line construction cost to the order of £290 per mile; moreover, it is found possible to tap an 11,000-volt line, erect a step-down transformer of 10-kVA capacity, and the requisite switchgear all complete at a cost of about £30.

Electricity is now available in 50 hamlets in 18 of the 23 parishes in the area to be served; the number of consumers totals 2,595, to whom 4,211,988 kWh were supplied during the year 1929. The capital expended has amounted to £98,365 and the revenue derived during the year ended February 15th, 1930, totalled £28,000. The total connections in the rural area aggregate some 5,135 kW, while 61 farms are connected to the mains.

Consumers take full advantage of the undertaking's facilities for the hire of all kinds of domestic apparatus and for the hire-purchase of wiring, which are much appreciated: for instance, wiring can be hired for 1d. per point per week for six years, after which it becomes the tenant's property; alternatively, the Corporation wires three points free and charges 2d. extra per kWh supplied until the cost of the wiring (namely, 25s. per point) has been defrayed, after which it is handed over to the tenant.

Probably one of the most economical 11-kV rural electricity transmission systems in existence, with its neat roadside distribution network, the Aylesbury undertaking is a worthy example of its kind. Of untiring energy and essentially practical in the conception and execution of his scheme, Mr. W. A. Turnbull has, with the blessing of his consultant (Mr. W. M. Selvey), the backing of a sympathetic municipal governing body, and the help of an enthusiastic staff, proved in no uncertain manner the latent electrical possibilities of an area which is typically rural in the fullest sense of that word.

Conditions in Portugal.

Review by the Commercial Secretary at Lisbon.

A REPORT on this subject by Mr. A. H. W. King, Commercial Secretary at the British Embassy, Lisbon, has been published by the Stationery Office for the Department of Overseas Trade (2s. net). The preliminary commercial summary shows that the area of Portugal is 34,600 sq. miles, and that the population in 1920 was 5,621,977. French is fairly well known, but English is less popular. Since the last report (1928) important measures of financial and administrative reform have been introduced, as a result of which the national finances have been placed on a sound footing, and budget equilibrium has been established. Although taxation is severely felt and credit is restricted, the fundamental condition of the country is sound, and there is little to occasion alarm as to the country's chances of ultimate recovery. On account of the lack of up-to-date statistics, little is said in the report regarding Portugal's foreign trade. It seems evident, however, that Germany is ahead of Great Britain in the supply of machinery and miscellaneous manufactured articles. In the case of electrical plant, British interests have suffered seriously from German and Italian competition. British manufacturers have, however, been successful in the case of heavy oil engines for both agricultural and industrial purposes.

No steps have yet been taken to develop the water power of the River Douro, regarding which a convention was signed between Spain and Portugal in 1927. It is apparently considered that the development of hydro-electric power is not, at the present time, adaptable to existing conditions, and that the work should only be undertaken when the Government is in a position to finance the scheme without foreign assistance.

In 1928 the Government passed a decree embodying the principle that the Government posts, telegraphs, and telephones should be handed over to private enterprise. It appears, however, that departmental objections have prevented the adoption of this plan, and the matter remains in abeyance. The Anglo-Portuguese Telephone Co., Ltd., operates within a radius of 30 km. round Lisbon and 20 km. round Oporto. It serves about 24,000 subscribers in a population of 816,000. The remainder of the country is served by the Government system, which has about 7,000 subscribers in a population of 5,000,000. The company is at present installing automatic equipment, which is to be put into service shortly.

Electrical equipment has been largely employed in the recent improvement of the Lisbon quays and docks. This includes at 35-metre electric swing bridge, twelve 3,000-kg. and one 10,000-kg. electric cranes, and the electrification of the pumping plant of two graving docks. Further improvements are contemplated at six ports, an expenditure of £2,500,000 being projected. A British firm of consulting engineers has been asked to examine the conditions and make proposals regarding improvements at Leixoes and Aveiro.

Tariffs and Hire-purchase.

Reports of two Committees appointed by the Electricity Commissioners.

TWO reports of more than usual importance, both prepared by Committees appointed by the Electricity Commissioners in March last year, have been issued this week. Though the Committees' recommendations have not yet been considered by the Commissioners, their reports have nevertheless been published at once for the information of the industry, as the subjects dealt with are likely to be of particular interest to existing and potential consumers of electricity in general.

Both reports are obtainable from H.M. Stationery Office, the first being priced at 1s. 6d. and the second at 1s. net. They will both be dealt with at greater length in subsequent issues.

Tariff Uniformity.

One of the Committees was appointed to make definite proposals whereby a greater measure of uniformity in respect of charges and tariffs could be brought about. It states emphatically that the offer of a standard multi-part tariff for general domestic supplies will be advantageous to all concerned. For the fixed-charge portion of such a tariff the size-of-house basis is recommended, such a tariff being considered suitable for adoption as a statutory method, alternative to a flat rate and at the option of the consumer. The Committee greatly deprecates the large number of two-part tariff variants now in use, and is strongly of the opinion that the present multiplicity of tariffs should cease.

For business premises, including offices, a simple tariff based on the number of kW demand ascertained either by indicator or by aggregating the number of watts installed, each case plus a small secondary (or kWh) charge.

For small industrial power purposes the combined consumption and installed demand method of charging is recommended, though not unanimously.

For rural areas any of the three above-mentioned methods of charging would be equally suitable, except for agricultural purposes, which have not yet reached the stage at which they can be considered as other than special cases.

Assisted Wiring and the Provision of Appliances.

The Committee on Assisted Wiring and the Hiring and Hire-purchase of Electrical Apparatus has come to the following conclusions.

With regard to assisted wiring, the Committee recommends that all electricity undertakers who hitherto have not done so should institute schemes for the provision of installations on a deferred-payment basis and make the availability of these systems known. As to the financing of such schemes the Committee says that this should be carried out in the case of individual undertakers, or groups of adjacent undertakings, by the undertakers themselves, and carried out by an organisation composed of a combination of the interests most closely concerned, namely, the authorised undertaker, or undertakers, the contractors and the British Electrical Development Association (a Joint Development Committee); or in the case of undertakers who are unwilling or unable to finance a scheme, by some existing financial organisation acting in conjunction with the undertakers and contractors through a similar organisation. An endeavour should be made to secure uniformity of practice in the provision of schemes and as to the organisation for dealing with such schemes. The Commissioners should call for information and make a yearly statement of progress of schemes throughout the country. It is recommended that undertakers should be given statutory powers to enable them to discontinue supply when consumers fail to pay instalments due on assisted wiring accounts. The Commissioners' attention is drawn to the position of companies whose tenure is terminating shortly, since it is not clear to what extent purchasing authorities would be obliged to take over unpaid balances on wiring agreements.

The Committee's recommendations with regard to the hiring and hire-purchase of appliances are as follows:—That undertakers who have not done so should be urged to offer facilities to their consumers for the hire or hire-purchase of heavy-current-consuming apparatus (cookers, water-heaters, fires, &c.) and the hire-purchase of lighter apparatus. That the organisation of these facilities should be undertaken through the machinery already recommended in connection with assisted-wiring schemes. That existing schemes should be amplified, where necessary, and uniformity of practice obtained. That, as in the case of assisted-wiring schemes, the Commissioners should, in due course, call for a report from undertakers as to the amount of business effected by undertakers directly and also through Joint Development Committees where established. Finally, the attention of the Commissioners is again called to the position of company undertakings which are liable to be purchased in the near future by local authorities.

Legal.

Cork Electric Supply Co., Ltd., v. Concannon and the British Thomson-Houston Co., Ltd.

This Dublin High Court action was brought by the plaintiff company to determine whether, in the event of a liquidation, the preference shareholders should participate rateably, or at all, with the ordinary shareholders in the distribution of any surplus assets, and whether the company was entitled to capitalise the surplus over the book value of the amount received for the undertaking from the Irish Electricity Supply Board and distribute it in the form of shares, and, if so, whether the preference shareholders would be entitled to participate rateably with the ordinary shareholders in such a distribution. The preference shareholders were represented by Mr. E. G. Concannon and the ordinary shareholders by the British Thomson-Houston Co., Ltd.

Mr. Justice Johnston, who had reserved judgment, last week gave a decision to the effect that the preference shareholders were not entitled to share in the distribution of surplus assets in a liquidation. He said that the company's articles of association merely gave the preference shareholders the right to a fixed dividend and to priority of re-payment in the event of a winding-up. The company had power to capitalise a surplus and distribute it in the form of shares and securities, but the preference shareholders were not entitled to participate in such a distribution.

Luen v. General Cable Manufacturing Co., Ltd.

In the King's Bench Division on July 24th, Mr. Justice Roche heard an action which Mr. Arthur Edgar Luen, Cardiff, electrical factor, brought against the General Cable Manufacturing Co., Ltd., of Leatherhead, Surrey, to recover commission as selling agent in South Wales for the defendant company. Plaintiff's claim was for £142, which was admitted, and plaintiff disputed a counterclaim by the defendants for a set-off of £287 in respect of a bill of exchange.

It was stated that when the agency was terminated an agreed account was submitted by the defendant company to the plaintiff. This showed a balance of £33 due from the plaintiff to the defendants, who now said, however, that that should have included the sum of £287 which had been omitted by mistake and for which they should have been given credit in the account.

His Lordship, after hearing evidence on both sides, said he was not satisfied that there had been a mistake in the account, and he gave judgment for the plaintiff for £142 with costs on the claim and counterclaim and dismissed the latter.

Symphony Gramophone and Radio (Foreign), Ltd.

A petition for the compulsory winding up of this company, presented by Darmstadter und Nationalbank Kommanditgesellschaft auf Aktien, of Berlin, came before Mr. Justice Bennett in the Chancery Division last week.

Mr. Buckmaster said the petition had been standing over on the understanding that a scheme was to be put forward. It was now proposed that the company should go into voluntary liquidation to enable it to realise its assets on the basis that it was solvent. He asked the judge to let the petition stand over until the first petition day next sittings.

Mr. Braund said he appeared for creditors and supported the adjournment.

His Lordship adjourned the petition until the first petition day next sittings.

Hobart Mfg. Co., Ltd., v. Morriss.

In the Bow County Court on July 25th, before Judge Thompson, K.C., the Hobart Manufacturing Co., Ltd., sued Benjamin Morriss, East Ham, to recover £100 or the return of one "A.M.V." electric potato-peeling machine, and a "Hobart" electrical peeling machine in the possession of the defendant. Alternatively plaintiffs claimed £97 under a hire-purchase agreement. The defendant denied that he had retained the two machines, or that they were in his possession. He stated that in February, 1927, he agreed to acquire on the hire-purchase system two potato-peeling machines, and the plaintiffs undertook to fix the machines in good running order and to maintain them for 12 months. In breach of this, however, they did not fix the machines in running order and numerous complaints were made by the defendant as to defects. They were useless, and failed to operate. They were not "Hobart" machines, but of inferior make and quality. The defendant had written asking the company to remove the machines, stating that he would not accept any further responsibility. In January, 1928, the plaintiffs commenced proceedings in the Mayor's and City of London Court for £95 alleged to be due in respect of the hire-purchase of the machines, but that action was abandoned. The defendant maintained that he had not had any use or benefit of the machines save for three weeks. He had paid £8 and considered that that was sufficient to pay for the use he had of them.

Judge Thompson said that he would adjourn the case for a little while for Counsel to try and arrange terms. After discussion it was agreed that the defendant should pay £45 in full settlement, £10 in 14 days, and the balance at £5 a month, and any default in the payments would mean the plaintiffs proceeding for the whole amount.

Judgment was entered in the agreed terms.

Alleged Conspiracy.

At Marlborough Street Police Court on July 26th, Hyman Reuben Spinney, company promoter, and his son, Cyril George Spinney, electrical engineer, of 79, Glenister Park Road, Streatham, were charged with obtaining 46 wireless valves by false pretences from Electric Lamp Factors, Ltd. There were two charges of this description, it being alleged that accused had paid for the valves by means of worthless cheques. There was a further charge of conspiracy with another man, not in custody, to obtain the goods by false pretences.

Mr. Powell, for the prosecution, said that prior to May 29th there had been one or two small dealings between the parties, and the cheques paid had been met. On May 29th the prosecutors read a telephone message from somebody who said that he was telephoning on behalf of H.P. Radio and Sports Supplies, 68, Long Lane, asking about certain wireless valves, and mentioning that somebody would call for them the next day. The next day the elder Spinney called and produced an order signed G. Wright. It would be shown that G. Wright was the younger Spinney. The elder Spinney handed over a cheque for £19 16s. drawn by G. Wright. It would be shown that it was the younger Spinney's cheque, and that he had no money in the bank to meet it. The elder Spinney took the goods away, and next day he called again with a further order. The accused, according to a printed document, said they had a warehouse and assembling rooms at Glenister Park Road, Streatham, whereas there were no such places. The premises were a private house. On the occasion of his second call the elder Spinney handed over a cheque for £16 10s. 9d., also drawn by G. Wright. On that occasion he said: "I shall arrange with Mr. Wright to open a trade account with your firm, and then the balance will go into that account." At 1 o'clock the same day he called back for 72 electric lamps, and the manager refused to give him any more goods because no further cheque was forthcoming. Thereupon Spinney, sen., asked him to wait until he got a cheque, and he came back with a cheque for £11 13s. 8d., and was given the goods. The three cheques were presented on the following Monday and were dishonoured. A police officer saw Spinney, sen., on June 10th and told him that inquiries were being made concerning G. Wright, and he replied that there was no firm of that name carrying on business at that address. Later the officer saw the younger Spinney and asked him whether he was the man who rented the office in the name of G. Wright and carried on business as the H.P. Radio and Sports Supplies, and he replied: "This place has nothing to do with me. I handed over everything to the company." When the elder prisoner was arrested he said that as it was a private prosecution there would be only the charge of obtaining the goods. He did not mind that so long as there was not a charge of conspiracy; his brother, son, and himself ran the business.

Mr. A. Fairbank, manager of the prosecuting company, gave evidence and the case was adjourned.

Peto-Scott Co., Ltd.

In the Chancery Division on July 28th, Mr. Justice Bennett sanctioned the scheme of arrangement between this company and its creditors which was outlined in our last issue (p. 140).

Sphinx Electric, Ltd.

Mr. Justice Bennett in the Chancery Division on Tuesday last had before him a petition by Ceag, Ltd., for the compulsory winding up of Sphinx Electric, Ltd.

Mr. Cleveland Stevens, K.C., for the Sphinx Company, said a scheme had been prepared which in effect provided for the guarantee of sums which with the money the company had in liquid assets would be twice the amount of the debts. A large body of creditors opposed the petition. As soon as the scheme went through the creditors would be paid in full. The guarantee was dependent on the scheme going through and something between £17,500 and £20,000 would be provided in cash. Petitioners' claim was for only £130.

Mr. Cecil Turner, for the petitioning company, asked for a winding up order. He said the scheme was only one for reconstruction. His clients' claim was for £134 for goods supplied but they had a further claim for £2,500 damages for failure to take delivery of a large number of bulbs.

Mr. Buckmaster said that the Commissioners of Inland Revenue were creditors for unpaid capital duty. They did not want to put the company in liquidation so long as there was a chance of their being paid.

Mr. Turnbull said he appeared for creditors for £7,000 who opposed the petition. These included a judgment creditor for £4,000.

Mr. Stevens said that the company's liabilities were £11,461 and its assets £13,685, excluding leaseholds, patents, and goodwill. Under the scheme the company would go into voluntary liquidation and a new company be formed with a capital of £125,000. Shares to the extent of £50,000 in the old company were to be surrendered and the shareholders would be asked

to take shares in the new company which would assume the liabilities of the old one. The creditors' chances of being paid must be considerably greater if the scheme went through. The scheme had been approved by the shareholders. An American financier, Mr. Frank Miller, who had a sales agreement with the company, was to provide £17,500 under the scheme.

Mr. Justice BENNETT adjourned the petition till the first petition day next sittings and gave liberty to either party to restore it in the event of the scheme going through or failing to do so.

[Some particulars of the scheme appear in our "Business Notes" section to-day.]

Correspondence.

Correspondents should forward their communications **as early as possible.** *No letter can be published unless we have the writer's name and address in our possession.*

Alternators for Two- and Three-phase Operation.

In your issue of March 28th, 1930 (see "Phi's" letter, p. 617) a correspondent asks where he can obtain a diagram of windings of a machine that can be used for supplying three-phase and two-phase currents.

I am not aware of any system in use answering the description he gives, but venture to suggest that the wiring diagrams of the electric drive on the American battleship *New Mexico* might be of some assistance to him.

A full description of that installation will be found in the *General Electric Review* of April, 1919.

Charles Rettie.

Liverpool, *July 26th*, 1930.

Interference with Radio Reception.

We were very interested in the recent correspondence in your columns regarding electrical interference with wireless reception. On behalf of a large number of listeners in this town, we have been endeavouring for some time to obtain some satisfaction from the authorities concerned regarding the intense interference caused in Darlington by the electric trolley-'bus service. After considerable correspondence with the B.B.C., &c., we have received a letter from the engineer-in-chief of the General Post Office stating that the Postmaster-General has no statutory powers to compel tramway and similar undertakings to adopt remedial measures.

So far as we can ascertain, no steps have been taken to successfully reduce the trouble, which is so bad that a very large proportion of the wireless listeners here are incapable of receiving any programme satisfactorily. It seems to us a lamentable state of affairs that the public is deprived of a service such as broadcasting in order to enjoy the doubtful service of the tramway system. Surely it could be possible to arrange for one to cause little or no interference with the other. Whilst the law remains as at present the wireless listener is likely to be the victim, and we suggest that strong representation should be made by every person affected to his member of Parliament.

E. & H. Glover,

Darlington, *July 24th*, 1930. H. GLOVER.

Published Specifications.

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged, and all subsequent proceedings will be taken.

1928.

33,450. "Thermionic valves." F. A. Goulding and S. F. Game. July 23rd, 1929. (331,231.)

38,481. "Radio receiving and amplifying arrangements." Dubilier Condenser Co. (1925), Ltd. December 31st, 1927. (303,371.)

1929.

334. "Manufacture and production of electrodes for secondary cells, in particular for those which have alkaline electrolytes." J. Y. Johnson (I. G. Farbenindustrie Akt. Ges.). January 4th, 1929. (Cognate application, 18,610/29.) (331,540.)

392. "Radio-receiving systems." A. Hall and Ferranti, Ltd. January 4th, 1929. (331,541.)

399. "Arrangement for the commutation of continuous current." Akt. Ges. Brown, Boveri et Cie. January 28th, 1928. (305,021.)

543. "Operating electric luminous discharge tubes with high-tension alternating currents." Patent-Treuhand-Ges. für Elektrische Gluhlampen, Dr. K. Wiegand, and K. Bratel. January 7th, 1929. (331,557.)

851. "Electric ovens." Moorwoods, Ltd., and H. Wheale. October 9th, 1929. (331,593.)

3,347. "Arrangement for regulating the potential in alternating-current trunk lines." Siemens-Schuckertwerke Akt. Ges. December 21st, 1928. (331,495.)

3,432. "Electric switches." British Thomson-Houston Co., Ltd. February 1st, 1928. (305,180.)

3,494. "Home or portable wireless receiver." W. A. Burns. February 1st, 1929. (Cognate application, 8,156/29.) (331,496.)

6,436. "Devices for the maintenance of telegraph, telephone, or signalling lines." G. Viard. March 8th, 1928. (307,458.)

6,720. "Electric furnaces." British Thomson-Houston Co., Ltd. March 1st, 1928. (307,031.)

7,040. "Electrical protective arrangements." General Electric Co., Ltd., and W. Wilson. March 4th, 1929. (331,544.)

7,206. "Electrical protective arrangements." British Thomson-Houston Co., Ltd., and C. G. Mayo. March 5th, 1929. (331,568.)

9,458. "Arrangement for true sound reproduction with electrical transmission." L. Mellersh-Jackson (Siemens & Halske Akt. Ges.). March 23rd, 1929. (Convention date not granted.) (308,620.)

9,906. "Electric switches." British Thomson-Houston Co., Ltd. March 28th, 1928. (308,617.)

10,072. "Electric totalisators." Automatic Telephone Manufacturing Co., Ltd., and L. M. Simpson. March 28th, 1929. (Cognate applications, 13,471/29 and 15,221/29.) (331,500.)

10,173. "Electric horns." J. Lucas and R. L. Neill. April 2nd, 1929. (331,504.)

10,226. "Telephone systems." C. S. Bleicher. April 21st, 1928. (310,029.)

10,257. "Preparing silicon steel sheets for electrical purposes." A. F. Murphy and W. Jones. April 2nd, 1929. (331,511.)

10,273. "Introduction of current into a metal vacuum discharge vessel." W. Dallenbach. April 2nd, 1928. (Addition to 267,136.) (308,989.)

10,327. "Relay for electric distant control." Compagnie des Forges et Aciéries de la Marine et d'Homecourt and E. Granat. June 26th, 1928. (314,374.)

10,363. "Electromagnetic friction device." Warner Electric Brake Corporation. April 28th, 1928. (310,517.)

10,564. "Telephone transmission systems." Standard Telephones and Cables, Ltd., and E. K. Sandeman. April 5th, 1929. (331,576.)

10,617. "Arrangements for converting sound waves into electrical energy." Dominion Gramophone Records (Foreign and Colonial), Ltd. April 28th, 1928. (310,519.)

10,618. "Electromagnetic vibrators." Automatic Telephone Manufacturing Co., Ltd., S. R. Smith, and T. P. Preist. April 5th, 1929. (331,580.)

10,621. "Telephone systems." Automatic Telephone Manufacturing Co., Ltd., and L. M. Simpson. April 5th, 1929. (331,581.)

10,643. "Electric clock installations." International General Electric Co., Inc. April 5th, 1928. (309,151.)

10,709. "Loud-speakers and the like." S. Prisner and E. Wender. April 6th, 1929. (331,585.)

12,069. "High-frequency thermionic generators." Telefunken Ges. für Drahtlose Telegraphie. April 21st, 1928. (310,043.)

12,586. "Methods of, and apparatus for, testing incandescent lamps and similar articles." British Thomson-Houston Co., Ltd. April 23rd, 1928. (310,339.)

13,431. "Interlocking keys for controlling electrical circuits." Automatic Telephone Manufacturing Co., Ltd., and L. M. Simpson. April 30th, 1929. (331,619.)

14,425. "Television receivers." Universal and General Radio Co., Ltd., L. M. Myers, and D. S. F. Adams. May 8th, 1929. (331,633.)

15,308. "Dynamo-electric machines, more especially for electric arc welding." Elin Akt. Ges. für Elektrische Industrie. May 25th, 1928. (312,357.)

15,315. "Valve amplifying apparatus for use with loud-speakers." Graham Amplion, Ltd., C. F. Philips, and E. N. Elford. May 16th, 1929. (331,639.)

15,696. "Manufacture of electric immersion heaters." General Electric Co., Ltd., C. W. Stopford, and O. W. Humphreys. May 21st, 1929. (331,647.)

15,847. "Electrical windings." British Thomson-Houston Co, Ltd. May 22nd, 1928. (312,240.)

15,898. "Machines for insulating electric cables." A. E. Chernack. May 22nd, 1929. (331,651.)

17,038. "Electric condensers or the like." A. L. Gregory, W. E. Barber, and E. Hoyle. June 4th, 1929. (331,662.)

17,611. "Short-wave wireless transmitting arrangements." C. Lorenz Akt. Ges. March 27th, 1929. (331,667.)

18,205. "Oil-immersed X-ray apparatus." Victor X-ray Corporation. June 14th, 1928. (313,568.)

18,320. "Polyphase electric supply systems." W. T. Taylor. June 14th, 1929. (331,671.)

18,698. "Means of connecting earthed choking coils or transformers in cascade." Koch & Sterzel Akt. Ges. December 24th, 1928. (331,676.)

19,021. "Means for maintaining substantially constant pressure in electrical apparatus utilising fluid insulation." British Thomson-Houston Co., Ltd. June 26th, 1928. (314,383.)

19,039. "Glow-discharge devices such as are used in the recording of sound." Gramophone Co., Ltd., and A. Whitaker. June 20th, 1929. (331,679.)

19,409. "Pins for thermionic valves and the like." E. Kleinmann and A. Mendel (trading as Kleinmann, Geb.). June 24th, 1929. (331,684.)

20,158. "Electric light fixtures." S. M. Hallam and R. E. Hine. July 1st, 1929. (331,690.)

20,309. "Electric switches." Associated Electrical Industries, Ltd. July 11th, 1928. (315,307.)

21,363. "Electricad precipitation plants." Lodge-Cottrell, Ltd. (H. V. Welch). July 11th, 1929. (331,699.)

21,468. "Shade holder for electric lamps." S. K. Olsen (trading as L. Poulsen & Co.). July 21st, 1928. (315,871.)

22,948. "Connection of cables and distribution boards and electrical appliances contained in boxes or cases." Simplex Conduits, Ltd., and H. F. McLoughlin. July 26th, 1929. (331,713.)

22,988. "Coil-loaded electric submarine cables." Felten & Guilleaume Carlswerke Akt. Ges. October 3rd, 1928. (331,714.)

24,280. "Control circuits." British Thomson-Houston Co., Ltd. August 8th, 1928. (317,018.)

25,586. "Telegraphic systems." C. Lorenz Akt. Ges. February 7th, 1929. (331,735.)

25,845. "Multiple-conductor electric cables." British Thomson-Houston Co., Ltd. August 25th, 1928. (317,864.)

26,549. "Image-scanning and reconstituting devices for television and picture-transmission purposes." Telephor Akt. Ges. April 16th, 1929. (331,765.)

29,621. "Electric junction boxes." S. D. White and H. W. Cron. September 30th, 1929. (331,771.)

30,913. "Battery hand lamp." Burgess Battery Co. October 16th, 1928. (331,781.)

31,723. "Manufacture of electric cables." Siemens-Schuckertwerke Akt. Ges. October 23rd, 1928. (331,786.)

34,605. "Disk-shaped electric motors." J. Salomon. November 13th, 1929. (Addition to 322,409.) (331,792.)

35,363. "Electric annealing furnace." Kupfer-Hirsch & Messingwerke Akt. Ges. December 15th, 1928. (331,793.)

35,957. "Long-distance electric cables." Felten & Guilleaume Carlswerk Akt. Ges. December 20th, 1928. (331,794.)

36,180. "Deep-sea cables." Felten & Guilleaume Carlswerk Akt. Ges. December 13th, 1928. (331,795.)

36,309. "Electric incandescent lamps." General Electric Co., Ltd. November 30th, 1928. (331,796.)

37,190. "Electrical insulating bushings." Associated Electrical Industries, Ltd. January 10th, 1929. (331,799.)

39,166. "Electric condensers." Elektricitäts Akt. Ges. Hydrawerk. December 28th, 1928. (331,803.)

1930.

11,357. "Means for operating electric luminous discharge tubes with high-tension alternating currents." Patent-Treuhand-Ges. für Elektrische Gluhlampen and Dr. K. Wiegand. January 7th, 1929. (Divided application on 331,557.) (331,590.)

15,404. "Electric totalisators." Automatic Telephone Manufacturing Co., Ltd., and L. M. Simpson. March 28th, 1929. (Cognate application, 15,405/30.) (Divided application on 331,500.) (331,515.)

15,551. "Electric totalisators." Automatic Telephone Manufacturing Co., Ltd., and L. M. Simpson. March 28th, 1929. (Cognate application, 23,302/29.) (Divided application on 331,500.) (331,516.)

15,681. "Electric totalisators." Automatic Telephone Manufacturing Co., Ltd., and L. M. Simpson. March 28th, 1929. (Cognate application, 15,682/30.) (Divided application on 331,500.) (331,517.)

15,802. "Electric totalisators." Automatic Telephone Manufacturing Co., Ltd., and L. M. Simpson. March 28, 1929. (Cognate applications, 15,803/30 and 15,804/30.) (Divided application on 331,500.) (331,518.)

New Work for Contractors.

Particulars of new works and building schemes for the use of electrical installation contractors in search of work and all interested in the sale of electrical and allied plant and other products.

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

BARNSLEY.—Town Hall (£130,000); Briggs & Thorneley, architects, Liverpool.

BARROW.—Grammar school; director of education.

BOURNEMOUTH.—Extensions, Stourfield and Charminster schools; borough engineer. Extensions, Wimborne Road; Barclay's Bank, Ltd.

BRIGHTON.—Houses (636), East Brighton estate; borough engineer. Extensions, Xaverian College, Tower Road; C. Unwin. Additions, Princes Cinema, North Street; H. B. Millar. New wing, Women's Hospital, Windlesham Road; governors.

CASTLEFORD.—R.C. school, St. Joseph's; R. A. Easdale and Son, architects, County Chambers (returnable deposit of £2 2s.).

COALVILLE.—Houses (76), Coalville and Whitwick; Harris Bros., builders, Derby.

COVENTRY.—School, Radford, for the City E.C. (£25,000); F. H. Harrod, director of education.

CROYDON.—Schools, Norbury, for the borough E.C.; director of education.

DURHAM.—School, Bishop Auckland, for Durham E.C.; F. Willey, architect, 34, Old Elvet.

EAST LOTHIAN.—Schools at Prestonpans and Tranent and additions to schools (£74,000); Master of Works, education authority, Haddington.

EDINBURGH.—Court buildings, Calton Gaol site; city architect.

EPPING.—Houses (50) for the U.D.C.; surveyor.

FAVERSHAM.—Houses (72) for the T.C.; Tree & Castle, builders, Ramsgate.

GLASGOW.—Additions to Empire Theatre; the manager. Shops, Germiston, and reconstruction of streets, Knightswood, for Corporation; city architect. Trades school for Corporation Education Department; city architect.

HALESOWEN.—Houses (89) for the U.D.C.; T. S. Beach, architect, 5, New Road (returnable deposit of £2 2s.).

HECKMONDWIKE.—Extensions, Grammar School (£12,000); governors.

HERTS.—School, Westbury, Letchworth, for Herts. E.C.; A. E. Prescott, county surveyor, Hatfield (returnable deposit of £3 3s.).

HORNCHURCH.—Houses for W. J. Standen (54) and Martin and Pearce (51).

INVERNESS.—Harbour extension; secretary to the Harbour Trust.

IPSWICH.—Church; Rev. D. E. Rae, Curate-in-charge of St. Thomas' Church.

KINGSTON-ON-THAMES.—Additions to Richmond Road and Bonner Hill Road schools for E.C.; borough surveyor.

KNARESBOROUGH.—Sanatorium (£200,000); county architect, County Hall, Wakefield.

LIVERPOOL.—Hospital; city medical officer of health.

LONDON (Hackney, E.).—Flats (196), Amhurst Road; borough engineer. School (720 places), Mount Pleasant Lane; L.C.C. architect.

(Poplar, E.).—Baths, Sophia Street; borough engineer. Municipal offices, Bow Road; borough engineer. Factory, 146-8, St. Stephen's Road; Andrews & Peascod.

(Whitechapel, E.).—School (460 places), Tench Street; L.C.C. architect.

(Shoreditch, E.).—School (800 places), Provost Street; L.C.C. architect.

(Islington, N.).—Reconstruction, Tollington Park Central School (£22,500); L.C.C. architect.

(Stamford Hill, N.).—School (400 places), L.C.C. architect.

(Tottenham, N.).—Baths and wash-houses (£23,000); U.D.C. surveyor.

LONDON.—(*Continued*).

(Stoke Newington, N.W.).—Municipal buildings; borough engineer.

(Bellingham, S.E.).—Shops and houses, Randlesdown Road (£11,200); L.C.C. architect.

(Southwark, S.E.).—Town Hall and library, Walworth Road (£317,000); borough engineer.

(Woolwich, S.E.).—Water supply improvements (£195,000); Metropolitan Water Board, engineer.

(Kensington, S.W.).—School (600 places); L.C.C. architect.

(Streatham, S.W.).—Cinema, next to Locarno Dance Hall; Nicholas & Dixon-Spain, architects. Ice skating rink, High Road; Robert Crombie, architect.

(Westminster, S.W.).—Tenements, Pulford Street, for Westminster Housing Trust, Ltd. (£120,000); Vincent Harris, architect. Extensions, London Library, St. James' Square; Mewes & Davis. Offices, Petty France; Brian L. Sutcliffe, architect.

(Bloomsbury, W.C.).—University buildings; Court of the University of London.

(Strand, W.C.).—Buildings, Lancaster House site; W. and E. Hunt. Rebuilding Crown property, corner of Strand and Duncannon Street; John Murray, Crown surveyor.

MAIDSTONE.—Warehouse, offices, &c., for Kent C.C.; W. H. Robinson, county architect (returnable deposit of £2 2s.).

MIDDLESEX.—School, Sunbury, with heating and lighting work, for County E.C. (£26,432); G. Challis, builder.

NEWCASTLE.—Schools, Wallsend (£40,000); A. V. Cleney, builders, Sunderland.

NORWICH.—Houses (300) for the T.C.; borough surveyor.

PAISLEY.—Houses (180), Seedhill Road site; burgh surveyor.

PERTH.—Art gallery (£36,000); burgh surveyor.

PLYMOUTH.—Cinema, Frankfort and Cambridge Streets (£40,000); H. J. Hammick, architect.

PONTEFRACT.—New premises for King's School (£28,976); governors.

SALTCOATS.—Houses (72); burgh surveyor.

SHEFFIELD.—Extensions to Infirmary (£30,000); Gibbs, Flockton & Gibbs, architects.

SHIPLEY.—Houses (70), Westfield Road; W. A. Ross & Sons. Public offices; U.D.C. surveyor.

SKIPTON.—Extensions, Grammar School (£21,000); governors.

SOLIHULL.—Houses, Alston Road, for R.D.C.; W. T. Orton, architect, 86, New Street, Birmingham.

SOUTHAMPTON.—Second section, civic centre (£115,000); E. Berry Webber, architect.

SOUTHEND-ON-SEA.—Factory for the Medway Knitting Co.; Crickmay & Shenstone, architects.

SPALDING (Lincs.).—Isolation hospital; surveyor to R.D.C.

STIRLING.—Swimming baths at Riverside (£11,400), and Larbert schools (£40,000); Master of Works, education authority.

STOKE-ON-TRENT.—Houses (50), Swan Lane (£18,838); C. Cornes & Son, Hanley.

SURBITON.—Library and fire station (£15,000); Joseph Hill, architect. Reconstruction of engine house, &c., at waterworks (£69,564); E. D. Winn & Co., Ltd., for Metropolitan Water Board.

SURREY.—Two schools, Sutton (£52,315), and school, Kingfield (360 places), for the E.C.; W. W. Finny, secretary, Kingston-on-Thames.

TENTERDEN.—Houses (30) for the R.D.C.; W. P. Woodgate, builder.

WARWICKSHIRE.—Schools, Kenilworth, for Warwickshire E.C. (£18,200); education architect, Leamington Spa.

WIGAN.—Houses (30), Newtown; borough engineer.

WILLINGTON (Co. Durham).—Houses (30) for the U.D.C.; surveyor.

WINCANTON.—Houses (51) for the R.D.C.; H. N. Alves, architect, 27, High Street, Glastonbury.